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Steel Works Activity

Reflected in Statistics for August

New Business Only Moderate—Pig Iron Stocks Reduced

The expansion of steel works operations in August, particularly in those of the United States Steel Corporation, is shown in our blast furnace statistics for that month. The production of coke and anthracite pig iron amounted to 1,926,637 gross tons, or 62,150 tons a day, against 1,793,068 tons, or 57,841 tons a day in July, a gain of 133,567 tons, or 4309 tons a day The production by steel companies last month was 47,120 tons a day, an increase of 4648 tons a day over July, whereas the merchant furnaces produced 15,030 tons a day, or 339 tons a day less than in July.

The capacity of the 203 furnaces active September 1 was 62,914 tons a day, against 59,690 tons a day for 196 furnaces on July 1. It is significant that the gain of 7 active furnaces in the month was entirely contributed by the Steel Corporation, which is also to be credited with more than 75 per cent. of last month's increase in pig iron output over that of July.

Steel ingot production of the Steel Corporation in August was 1,228,000 tons, which compares with 1,014,000 tons in July, and is the high record for the year. In pig iron a record for 1911 was made also, with an output of 976,000 tons.

Concerning bookings and shipments, it is stated that those of the leading interest were greater in August than for any month of the year. The same statement might be made for other steel companies as to shipments; indications are that they have not made a record for the year in new business. The past week has been a quiet one in finished material and the larger fall buying, of which there have been some predictions, is not in evidence as yet.

While no new points of weakness have developed in mill prices, the drift of the market is in the buyer's favor, and the concessions repeatedly referred to in recent weeks have become more general. In the wire trade buying has fallen off, as is natural after a campaign like that of August, in which the business was first closed up and the open announcement of cut prices made later.

The widespread rumors of new prices in wrought iron pipe have not encouraged buying and the market is on the same competitive basis that has existed for some weeks, though with only fractional variations in the prices of various producers.

Operations of steel car works are slackening. One plant in the Pittsburgh district is running at 30 per cent. and another at 50 per cent. of capacity.

Steel billets are still sold below the $21, Pittsburgh, basis that for some time has been considered the market. Extras are less rigidly adhered to.

In the foundry pig iron market the controlling conditions are the fact that nearly all melters have a supply for this year and the knowledge that a large idle blast furnace capacity is waiting for the first sign of better prices to blow in. Buyers are skeptical of the attempt to establish a higher price for the first quarter of 1912. It is significant that the production of merchant pig iron in August, 15,030 tons a day, was only 50 tons a day more than the average for the entire bad year 1908, when consumption was considerably less than the rate to-day, though pig iron stocks in 1908 were less.

Stocks of pig iron in the central West at merchant and steel works furnaces, apart from those of the Steel Corporation, were reduced 45,000 tons in the second half of August. The Corporation has now only 150,000 tons on hand, or less than a four days' supply.

An inquiry for 3500 tons of basic pig iron for this year's delivery has come from a northern Ohio steel company.

Lake Superior ore shipments in August were 5,548,311 tons and for the season to September 1 they were 19,301,846 tons, or 9,525,183 tons less than to September 1 last year. The movement will slacken off from this time on and little ore will be brought down in November.

Labor and Lower Prices for Commodities

We have the following letter from George Q. Thornton, president of the Carondelet Foundry Company, St. Louis:

"ST. LOUIS, MO., August 30, 1911.

"To the Editor of *The Iron Age*.

"Dear Sir: Referring to your articles in the issue of August 24 under heading 'Any Readjustment Will Include Labor,' I should like to ask the following questions:

"1. Would a reduction in general prices of commodities, by tariff change or otherwise, tend to increase or reduce the consumption and sale of such commodities?

"2. If sales of commodities are increased by such reduction in price, would more or fewer workmen be required in their production?

"3. If the result of such increased sales should be a greater demand for workmen, would the tendency be to reduce or increase wages?

"I am assured that we need at this time especially some clearer thinking on these and kindred subjects. As a reader of your journal of many years' standing, I should like to see your detailed comments on the above in as conspicuous a place as that occupied by the article in question, which I fear may have a rather misleading tendency.

"Yours truly,

GEO. Q. THORNTON."

Our correspondent has framed his questions so as to leave no room for doubt as to the answers he would make. The syllogism he would construct is a familiar one; it has frequently been used in theoretical discussions of the tariff. We have never considered theoretical discussions of this question to be profitable, especially when certain assumed economic conditions rather than actual experience are made the basis of argument. As an illustration, we might follow our correspondent's third question with two running like this:

> If the demand for commodities is increased, would the tendency be to reduce or raise the prices of such commodities?
>
> And if prices of such commodities were advanced, would their consumption and the demand for workmen engaged in their production increase or decrease?

Generalization is easy and if we are allowed to select a set of economic facts to the exclusion of all others, the process of reaching a conclusion is much simplified. It is not difficult, moreover, by traveling in a circle to arrive at a given starting point.

Our correspondent suggests that reductions in prices of commodities, from whatever cause, result in greater consumption, with larger employment of labor and hence a tendency to higher wages. The lowest prices of iron and steel this country has ever known were reached in the years 1893 to 1898, the years in which labor in the iron industry received the lowest wages in a generation. In 1899 in the same industry prices were the highest in ten years, labor the best paid and consumption at high mark. If low prices are a necessary cause of increased demand it would be hard to explain the record consumption of pig iron in the United States in 1907, for example, when the average price of No. 2 Southern iron was nearly $20 at the furnace, as compared with $10 for 1911. The theory that low prices are the route to enlarged consumption, larger employment of labor and hence to maintained, if not increased, wages, is not supported by the history of the iron trade in the past 20 years of its most notable expansion. Low prices have been generally accompanied by low demand and low wages.

Other things remaining the same—and here "other things" refers chiefly to purchasing power—a reduction in the price of a commodity tends to a larger use of it. But a distinction is to be made between a reduction in price due to a smaller expenditure of human labor, as for example a reduction resulting from invention, and on the other hand a reduction due to aggressive competition and inroads upon the returns to capital. A proposal for a general reduction in commodity prices as a means to higher wages might well rank with a general movement among manufacturers to raise wages as a means of increasing the public's purchasing power and thus eventually securing higher prices for products. The theory may be good enough but it does not agree with practice.

It was said in our editorial of August 24 that the moves now being made by legislative proposals and by proceedings against large corporations aimed at reducing prices. This scaling down of values, it was added, is ostensibly to be brought about without any reduction in the price of labor. Further, it was said that if there came a general downward revision of values of manufactured atricles, American labor engaged in the affected lines would have just one choice—either to bear a reduction in wages or give an increased output for the existing wages. The point emphasized was simply that under the conditions existing in this country the attempt to cut down the returns on capital invested in manufacturing industries without hurting labor employed in such industries will prove disappointing.

What has happened in the reduction of railroad

forces in the effort to pay dividends while operating expenses steadily increased is a fact which no theory can abate. High labor cost has been the complaint of manufacturers for the past five years. Further increasing competition and further cutting down profits, which, as is well known, have already been seriously curtailed in many lines since 1907, will only postpone the larger investment of capital which must precede any great increase in the demand for labor.

We are not concerned at the moment with the question of the efficacy of the measures proposed, as remedies for the high cost of living. That they will do all that has been claimed for them in this direction there is serious doubt. But we find nothing in our industrial record to warrant the conclusion that a policy which will hurt industrial capital can be enforced with no accompanying hardship to labor.

Chicago Business Men's Pluck

The courage and persistence of the average business man in the face of exasperating and disheartening conditions are well exemplified in Chicago at the present time. During the entire year building operations have been held up, at times almost to the point of complete suspension, because of a local plumbers' and steam fitters' strike. This labor trouble is particularly vexatious because it is occasioned by a purely jurisdictional dispute between two organizations and not by any matter regarding which contractors and men are at variance. The local organization of steam fitters has refused to permit, in the past, any work being done in Chicago by outside steam fitters. The organization of local plumbers, to which the outside steam fitters also belong, is now insisting that its steam fitters be allowed to work in Chicago and that the local steam fitters as individuals affiliate with the plumbers' union. The local steam fitters are supported by the building trades organization in Chicago, with the result that on those buildings where the plumbers are engaged all the other artisans strike, and vice versa, where the local steam fitters have contracts no plumbing can be put in. In connection with that work which is permitted to progress, there is little concealment of the fact that "peace money" from the builders has been influential with those in control of the labor situation. At the present time the situation continues in a state of deadlock, with no immediate solution in view.

In spite of this deplorable and inexcusable tie-up, there are now in process of construction in the loop district of Chicago 11 buildings in which 67,000 tons of structural steel is being erected, at an approximate cost of $25,000,000, and permits have just been issued for eight additional buildings requiring 40,000 tons of steel, to be built at a cost of nearly $17,000,000. The buildings included in this remarkable aggregate investment of $42,000,000, and an estimate of the quantity of steel each will require, are as follows: Hearst, 3000 tons; Rand-McNally, 6800; Insurance Exchange, 14,000; New Otis, 7500; McCormick addition, 3000; Monroe, 2500; Mallers, 4500; Rothschilds, 11,000; Mandel, 10,000; City Hall square, 3000; Hamilton Club, 1500; Kesner, 4000; Continental and Commercial National, 14,000; Chicago, Burlington & Quincy, 5000; Lytton, 3500; Marshall Field estate, one 3500 and another 4000; Boston Store, 2000; Morrison Hotel, 4000. These figures do not include 7000 tons for the new Field Museum to be located in Jackson Park.

This great building movement in Chicago is significant in at least two respects: 1. That the banks are in a position to take care of propositions of this aggregate magnitude very pointedly demonstrates the existence of large balances on deposit and the low rates of interest prevailing; it was stated a short time ago, regarding one of the Chicago banks, closely associated with the estate for which two new buildings are to be erected, that it had on deposit the largest amount in its history. 2. The buying of over 100,000 tons of fabricated steel at this time cannot be considered as significant of anything but extremely low prices for fabricating contracts. Following the three years of strenuous competition since 1907, the taking of this tonnage cannot have greatly strengthened the financial position of the fabricators who have made the successful bids.

It must be conceded that the city ordinance limiting to 200 feet the hight of buildings started in the loop district of Chicago after September 1 hastened the decision to erect some of these structures, but many of them had been under consideration before that date was fixed. Moreover, this is not the first time that Chicago has attempted to limit the hight of buildings by an ordinance, but each one was soon after repealed.

It would seem that the time had long since arrived for some concerted and drastic action by means of which the strife between the Chicago plumbers and steam fitters would be summarily ended. Such a costly business disturbance, for which there is so little excuse and from which benefit cannot possibly accrue to any but the few instigators, should have been terminated long ago. If it had been due to anything else than a labor fight, it would not have been permitted to continue for any length of time.

Congressman Underwood's Boast of Cheap Iron

When Representative Underwood of the Birmingham, Ala., district, made his famous reply August 2 on the floor of the House of Representatives to William J. Bryan's criticism of his position on the wool tariff, no part of his speech was applauded more vigorously than his frank admission of his ownership of stock in the Woodward Iron Company. The purpose of that speech was to make clear to all his hearers and to the country generally that, although interested in the manufacture of pig iron, Mr. Underwood had unselfishly favored a reduction in the iron and steel schedule. But, in the course of his remarks he made this declaration: "I say without expectation of contradiction that the furnace company in which I am interested can make pig iron cheaper than it can be made anywhere else in the world."

If Mr. Underwood had announced that the furnaces in which he is interested are among the most expensive to run in this country, and yet he favored a reduction in iron duties, his attitude would have been clearly altruistic. Boasting, however, that his company can make pig iron cheaper than any other maker of iron in the world, he is placed in the position of being absolutely without fear of any injury to his investment from the competition of other iron manufacturers. In point of fact, this declaration would naturally subject him to the charge that he is complacently willing to have his less fortunate domestic competitors crippled or run out of business. It would not take much of a reduction from the present low level of pig iron prices to put quite a number of active furnaces out of the running.

July Iron and Steel Exports and Imports

Both exports and imports of iron and steel showed a sharp reduction in July as compared with June, according to the report of the Bureau of Statistics of the Department of Commerce and Labor. The total value of the exports of iron and steel and manufactures thereof, not including iron ore, was $18,052,337 in July against $20,310,053 in June, while the value of similar imports in July was $2,015,692 against $2,777,718 in June.

The exports of commodities for which quantities are given totaled 162,282 gross tons in July, against 173,818 tons in June, and 173,920 tons in May. The details of the exports of such commodities for July and for the seven months ended with July, compared with the corresponding periods of the previous year, are as follows:

Exports of Iron and Steel.

	July		Seven months ended July	
Commodities.	1911. Gross tons.	1910. Gross tons.	1911. Gross tons.	1910. Gross tons.
Pig iron	9,446	17,504	76,577	53,213
Scrap	5,919	1,110	51,438	12,949
Bar iron	1,479	1,826	11,007	11,340
Wire rods	1,074	1,024	9,564	14,616
Steel bars	7,960	10,657	71,178	58,388
Billets, ingots and blooms	13,578	126	149,419	7,657
Steel rails	40,973	27,886	269,853	218,518
Iron sheets and plates	8,862	7,105	64,415	61,374
Steel sheets and plates	17,190	11,020	126,414	11,648
Tin and terne plates	4,713	372	30,291	7,056
Structural iron and steel	21,287	14,028	125,665	89,042
Barb wire	6,424	5,590	46,705	42,380
All other wire	7,316	8,723	74,294	54,654
Wire nails	560	583	5,877	3,826
Cut nails	1,816	4,723	29,834	25,568
All other nails, including tacks	905	891	7,348	5,835
Pipe and fittings	12,780	14,406	111,784	88,560
Totals	162,282	127,574	1,261,663	766,624

The imports of commodities for which quantities are given totaled 15,252 gross tons in July, as compared with 29,394 tons in June and 23,375 tons in May. The details of such imports for July and for the seven months ended with July, as compared with the corresponding periods of the previous year, are as follows:

Imports of Iron and Steel.

	July		Seven months ended July	
Commodities.	1911. Gross tons.	1910. Gross tons.	1911. Gross tons.	1910. Gross tons.
Pig iron	8,538	19,865	97,552	139,918
Scrap	1,419	3,033	12,572	60,389
Bar iron	2,300	2,922	16,496	24,934
Billets, bars and steel forms, n. e. s.	1,394	3,283	17,395	27,594
Sheets and plates	168	302	1,410	4,073
Tin and terne plates	235	10,790	12,369	47,010
Wire rods	1,198	1,737	10,001	12,152
Totals	15,252	41,932	167,795	316,070

The imports of iron ore in July were 200,845 gross tons, against 118,296 tons in June and 248,810 tons in the month of July, 1910. The total importations of iron ore for the seven months ended with July were 1,002,713 tons, against 1,508,076 tons in the corresponding period of 1910. Of the July imports of iron ore 90,205 tons came from Cuba, 49,201 tons from Spain, 32,870 tons from Newfoundland, 23,492 tons from Sweden, 518 tons from Canada and 4,559 tons from other countries.

The total value of the exports of iron and steel and manufactures thereof, not including iron ore, for the seven months ended with July, was $143,917,270, against $112,519,587 in the corresponding period of 1910.

The total value of the imports of iron and steel and manufactures thereof, not including iron ore, for the seven months ended with July, was $17,944,044, against $24,285,898 in the corresponding period of 1910.

Pittsburgh and Vicinity Business Notes

The Dravo-Doyle Company, Pittsburgh, has established a steam specialty department, with J. C. McAllister, Jr., in charge, and is now prepared to offer steam specialities such as steam traps, back pressure valves, pump governors, boiler feed water regulators, etc.

The Standard Steel Tank & Mfg. Company, Pittsburgh, has been granted a Delaware charter with a capital of $100,000, and it is understood will build a plant in Pittsburgh to manufacture steel tanks, boilers and heavy plate work. The incorporators are Joseph L. Kontz, F. M. Strecker and M. L. Daina, all of Pittsburgh.

Stockholders of the Hazel-Atlas Glass Company will hold a meeting in Wheeling, W. Va., on September 7 to act on a proposition to increase the capital stock to $3,000,000. The company proposes to make some large improvements to its plant, using the proceeds of the increase in its capital for this purpose.

The City & Elm Grove Railroad Company, Wheeling, W. Va., has employed Chester & Fleming, consulting engineers of Pittsburgh, to make a complete examination and report of the water-works system for Pleasant Valley, a suburb of Wheeling, with reference to extensive improvements in the water supply.

The Westinghouse Electric & Mfg. Company, East Pittsburgh, has received a very large order from the Boston Elevated Railroad for car apparatus, it being the third large order received from the same buyer the past three months. This order brings the aggregate business of the company for the first four months of its current fiscal year up to a level that compares favorably with the corresponding period a year ago.

The Petroleum Iron Works Company, Sharon, Pa., builder of heavy plate work of all kinds, has elected directors as follows: C. H. Todd, J. L. Considine, C. J. McDowell, R. T. McCormick, J. P. Sweeney of Sharon; J. S. Cullinan, Houston, Tex., and John Slater, Washington. The directors elected the following officers: C. H. Todd, president; J. L. Considine, vice-president; J. P. Sweeney, secretary and treasurer; H. C. Knowles, assistant secretary and treasurer. The company reports its business of the past year as satisfactory.

The Osceola Silica & Fire Brick Company, Oliver Building, Pittsburgh, Pa., whose plant is at Osceola Mills, Clearfield Company, Pa., has closed with the Pittsburgh Crucible Steel Company, for furnishing about half of the No. 1 fire brick required in the construction of the latter's new plant at Midland, Pa. A facsimile of the order from the Pittsburgh Crucible Steel Company has been printed and is being issued as an advertisement. It calls for 1,500,000 to 2,000,000, quantity at buyer's option, first quality Osceola fire brick. The Osceola Company has recently spent $30,000 in improving its plant in various ways.

The new foundry of Spang, Chalfant & Co., Inc., at Etna, Pa., is mainly built of reinforced concrete. It is to be a two-story building, 100 x 467 ft. at one end, with an ell 100 x 250 ft., and a three-story office 60 x 100 ft. The larger building will contain a socket shop, a machine shop and a pattern shop. The roof is entirely concrete, covered with a composition weather proof roofing. The machine shop contains a 20-ton 50-ft. span crane and the socket shop a 10-ton 98-ft. span crane. The building is entirely fireproof, no materials other than concrete and steel being used.

The Universal Sanitary Mfg. Company, New Castle, Pa., has started to rebuild its plant, which was recently destroyed by fire. It will be about one-fourth larger than the former plant. The company had inducements offered to locate in some other city, but all were turned down. The new plant will include five buildings, each 40 x 187 ft., of brick.

The Alliance Brass & Bronze Company, Alliance, Ohio, has contracted for a new building, to be of brick, 40 x 100 ft. The product will be brass, bronze and all other kinds of non-ferrous castings.

The Positive Clutch & Pulley Works, 30-32 Lansing street, Buffalo, N. Y., states that its Canadian company is building a new factory consisting of a foundry, machine shop, woodworking shop, power plant, etc., at Aurora, Canada, which is about 16 miles from Toronto. Ground has been broken, some of the buildings are now under construction and it is hoped to have the plant or certain portions of it ready for use in November. Such machinery as is now in use in Toronto will be moved to Aurora, and while some additional machinery will be purchased for the new plant the greater part of it has already been acquired. The general offices and warerooms for carrying stock will be continued in Toronto. The Canadian works are conducted under the name of the Positive Clutch & Pulley Works, Ltd.

Morrison & Smith, Rio Hondo, Tex., intend to build a water and electric light system and are in the market for the necessary equipment and material.

Recent Experience with Titanium Rails

The Titanium Alloy Mfg. Company, Charles B. Slocum, general sales agent, Pittsburgh, has added to its publications relating to the effect of titanium on iron and steel, a 40-page pamphlet giving data bearing on the company's claim that titanium has solved the steel rail problem. It is stated that while three years ago the titanium rail was being tried on a few roads it is now in service on more than fifty steam railroads and on the more important traction lines, a total of 400,000 tons of such rails being now in use. The experience of the New York Central Railroad, concerning which publication has already been made, is cited; also that of the Lehigh Valley, the Lackawanna, the St. Paul, the B. & O., the Burlington and other lines. The Lehigh Valley Railroad has bought 23,000 tons of open-hearth steel rails for 1911, all of high carbon and high titanium content. A section is shown of the Bethlehem Steel Company's 110-lb. open-hearth titanium rail rolled for the Lehigh Valley. The analysis of the steel shows carbon 0.92, phosphorus 0.024, sulphur 0.021, manganese 0.887, and silicon 0.94 per cent. The steel is treated with a 10 per cent. titanium alloy, the amount used being equal to 1 per cent. of the weight of the steel.

Up to June, 1911, the Chicago, Milwaukee & St. Paul had bought 40,000 tons of titanium rails for this year, the use of 0.10 metallic titanium being called for. The Burlington ordered 10,000 tons of rails in 1911 for which titanium alloy was specified, and these rails will be used on every curve on the Burlington system. The results of 569 days' service of titanium rails on Erie Railroad curves showed in one case an average durability of 40 per cent. more for the titanium rails than for others, and in another case 46 per cent. greater durability.

A Scotch Bar Iron Combination

The London Economist publishes the statement that negotiations which have been in progress for the amalgamation of the Lanarkshire manufacturers of bar iron appear to have a fair prospect of success. The task of finding an equitable basis for amalgamation proved to be beyond the powers of the makers themselves, and a London syndicate—said to be the same that brought the tube trade negotiations to a successful conclusion—has taken the matter up, and prepared a scheme which has secured a degree of acquiescence sufficient to encourage the hope that it may ultimately be accepted with some modification.

According to a draft prospectus, which has been submitted to the principal makers, it is proposed to float a company with a capital of $3,000,000, equally divided into ordinary and preference shares, the former to be issued to the present proprietors of the works as part of the purchase consideration and the latter to be offered for public subscription, while, in addition, debentures to the amount of $1,500,000 will be subscribed by the promoters.

There are still obstacles sufficiently formidable to leave an element of doubt as to the final outcome of the negotiations. The most serious is the attitude of those steel-making works which have within recent years added bar rolling mills to their equipment. The responsibility for the recent excessively keen competition in the home trade has been laid at the door of those concerns who, having a market to find for their new department, and not relying solely upon the making of bars for their profits like the bar iron producers pure and simple, cut prices. Not only did they persistently decline to become parties to the schedule of minimum prices drawn up by the association, but they are now affecting indifference with regard to the overtures being made for the purchase of their bar mills. It is believed, or at least hoped, that this indifference is more assumed than real, and is not entirely unconnected with the fixing of the price to be paid.

It is stated that the most important of those mixed works, while not willing meantime to sell out on the terms proposed, are prepared to facilitate the amalgamation by undertaking to work in harmony with the new company by falling in with the arrangement for the regulation of the output so as to maintain prices. Even among the 14 old-established bar iron makers there is very far from complete unanimity as to the acceptance of the scheme in all its details, one of the most formidable difficulties being the differences as to the valuations at which the works are to be taken over. The capacity of the works is equal to approximately 350,000 tons.

Coming Meeting on Accident Prevention

Accident prevention and administration by commissions are two of the topics to be discussed at length at the Chicago conference of the American Association for Labor Legislation, September 15 and 16, at the Auditorium Hotel. The programme is as follows:

Friday, 2:15 P. M. Standardization for Accident Prevention.

Presiding officer, Henry R. Seager, president, American Association for Labor Legislation.

Scientific Accident Prevention: John Calder, general manager Remington Typewriter Works, Ilion, N. Y., formerly inspector of factories in Scotland.

Safety Standards through State Inspection: Edgar T. Davies, chief inspector of factories for the State of Illinois, formerly member of the Illinois State Industrial Commission.

Practical Safety Devices (stereopticon lecture): Robert J. Young, safety inspector Illinois Steel Company.

Among those who are specially invited to lead the informal discussion are: Louis Guyon, chief factory inspector, Province of Quebec; C. W. Price, International Harvester Company; Ferd C. Schwedtman, National Association of Manufacturers; John H. Walker, president Mine Workers of Illinois; James D. Beck, Wisconsin Industrial Commission; and David Van Schaack, Aetna Insurance Company, Hartford, Conn.

Friday, 8:15 P. M. Administration by Commissions.

Presiding officer, Charles P. Neill, commissioner United States Bureau of Labor.

The Massachusetts Board of Boiler Rules: Joseph H. McNeill, chief boiler inspector of Massachusetts and chairman State Board of Boiler Rules.

The Wisconsin Industrial Commission: John R. Commons, member Wisconsin Industrial Commission, formerly professor of Economics, University of Wisconsin.

The Constitutionality of Commission Orders: Louis D. Brandeis.

Among those who are specially invited to lead the informal discussion are: Gilbert E. Roe, attorney, New York City; Bernard Flexner, attorney, Louisville, Ky.; Charles McCarthy, Wisconsin Legislative Reference Library; and John Williams, commissioner New York State Department of Labor.

Saturday, 9:30 A. M. Uniform Reporting of Industrial Injuries.

Presiding officer, John R. Commons, member Wisconsin Industrial Commission.

The Beginning of Occupational Disease Reports: John B. Andrews, secretary American Association for Labor Legislation.

Accident Records in Minnesota: Don D. Lescohier, expert Minnesota Bureau of Labor.

The Advantages of Uniform Accident Schedules: Edson S. Lott, president United States Casualty Company.

A Plan for Uniform Accident Reports: Leonard W. Hatch, chief statistician New York State Department of Labor.

Among those who are specially invited to lead the discussion are: J. L. Rockey, chief Pennsylvania Bureau of Industrial Statistics; W. A. Allport, Illinois Commission on Occupational Diseases; David Ross, Illinois Bureau of Labor; Charles F. Gettemy, Massachusetts Bureau of Statistics; Thomas P. Kearns, Ohio Department of Factory Inspection; and Stanley L. Otis, Bureau of Liability Insurance Statistics, New York City.

Saturday, 2:15 P. M. Round Table Conferences.

Uniform Accident Reports.—A continuation of the session of Saturday forenoon, for the purpose of drafting the schedule for uniform accident reports.

Conference of Commissioners on the Administration of Workmen's Compensation Acts.—Presiding officer, C. H. Crownhart, chairman Wisconsin Industrial Commission. Discussion led by Amos T. Saunders, of Massachusetts.

Business Meeting, General Administrative Council, American Association for Labor Legislation. Discussion of Immediate Programme.—(1) Prohibition of poisonous phosphorus in the manufacture of matches; (2) Investigation of occupational diseases; (3) Reporting of industrial accidents and diseases; (4) Workmen's compensation for industrial injuries; and (5) Enforcement of labor laws.

The World's Production of Aluminum

The Frankfurter Zeitung recently published the following interesting statement regarding the aluminum industry: "The development of the aluminum production has been unusually rapid, the world's production having risen from 11,500 metric tons in 1905 to 24,200 metric tons in 1909 and 34,000 metric tons in 1910. The distinctive feature about the aluminum trade is that it is in the hands of only twelve companies of which five, namely, the Aluminum Industrie Akt. Ges. of Neuhausen, the Société Electro-Metallurgique Française of Froges, the Compagnie des Products Chimiques d'Alais et de la Camargue of Salindres, the British Aluminum Company, Ltd., and the Aluminum Company of America, account for nine-tenths of the total output. The price of aluminum per kilogram was 27s. in 1890, 2s. in 1900, 3s. 3d. to 3s. 9d. in 1905, 1s. to 1s. 6d. in 1909 and 1s. 3d. to 1s. 7d. in 1910." The equivalent of the 1910 prices in United States money is 11.9 cents to 15.5 cents per lb.

The Vilter Mfg. Company, whose general offices are at 1008 Clinton street, Milwaukee, Wis., has found it necessary by reason of increased demands to provide better facilities on the Pacific coast and announces the removal of its branch in Los Angeles, Cal., to 2612 South Main street, where larger quarters have been secured, comprising not only an office but also a storehouse. A complete line of ammonia fittings and sundries, as also small ice and refrigerating machines, as well as ice tanks, will be carried in stock. C. M. Gay, who has been connected with the company for many years, continues in charge.

August Pig Iron Output

Large Increase Over That for July

Steel Works Furnaces Show More than the Entire Gain—Merchant Output Slightly Less

Our blast furnace statistics for August reflect the expansion in steel works operations which has been the chief market development of the past month. The output of coke and anthracite pig iron was 1,926,637 gross tons, or 62,150 tons a day, as against 1,793,068 tons, or 57,841 tons a day in July. The increase in the production of steel works furnaces was more than the increase in all kinds of pig iron, such furnaces producing 47,120 tons a day last month, an increase of 4648 tons a day, while the merchant furnaces produced 15,030 tons a day last month, a falling off of 339 tons a day from July. The number of active furnaces September 1 was 203, a gain of 7 in August, while the active capacity at the opening of this month was 62,914 tons a day, a gain of 3224 tons over August 1.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, beginning with August, 1910, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel works.	Merchant.	Total.
August, 1910	46,534	21,429	67,963
September	47,007	21,536	68,542
October	45,794	21,726	67,520
November	41,427	22,232	63,659
December	35,909	21,440	57,349
January, 1911	36,401	20,351	56,752
February	42,349	21,741	64,090
March	48,970	21,066	70,036
April	47,805	21,031	68,836
May	42,270	18,809	61,079
June	42,708	16,877	59,585
July	42,472	15,369	57,841
August	47,120	15,030	62,150

Output by Districts

The table below gives the production of all coke and anthracite furnaces in August and the four months preceding:

Monthly Pig Iron Production—Gross Tons.

	April. (30 days)	May. (31 days)	June. (30 days)	July. (31 days)	August. (31 days)
New York	139,674	130,927	130,395	124,347	118,145
New Jersey	5,510	9,788	3,600	1,386	.....
Lehigh Valley	78,182	79,731	72,787	66,404	77,021
Schuylkill Valley	55,305	46,827	44,039	45,859	53,397
Lower Susquehanna and Lebanon Val.	44,537	44,179	41,751	40,084	38,741
Pittsburgh district	488,447	422,000	415,519	419,248	469,012
Shenango Valley	109,239	88,170	78,196	79,571	84,884
West. Penn.	100,593	61,892	60,047	73,177	96,366
Maryland, Virginia and Kentucky	60,978	53,271	48,969	52,583	46,262
Wheeling district	119,489	115,213	93,617	93,973	94,476
Mahoning Valley	189,822	187,748	188,187	184,402	189,200
Central and North. Ohio	161,742	152,909	141,973	116,953	131,850
Hocking Valley, Hanging Rock and S. W. Ohio	27,084	27,185	20,245	11,321	7,262
Mich., Minn., Mo., Wis., Col., Wash.	76,379	71,938	54,391	57,661	63,114
Chicago district	236,550	238,424	249,666	272,817	287,875
Alabama	149,737	134,386	117,015	126,200	140,879
Tenn., Georgia and Texas	22,178	28,868	27,169	27,082	28,153
Total	2,065,086	1,893,456	1,787,566	1,793,068	1,926,637

Production of Steel Companies

Returns from all plants of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel making iron is included in these figures, together with ferromanganese spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production":

Production of Steel Companies—Gross Tons.

	Pig.—Total production.—			Spiegeleisen and ferromanganese.	
	1909	1910	1911	1910	1911
January	1,117,823	1,773,201	1,128,448	19,538	8,360
February	1,073,363	1,620,539	1,185,782	21,396	12,821
March	1,140,553	1,739,212	1,518,063	25,591	11,784
April	1,093,092	1,669,898	1,434,142	22,304	10,657
May	1,356,448	1,619,283	1,310,378	26,529	13,641
June	1,365,527	1,549,112	1,281,241	27,680	22,611
July	1,508,762	1,462,689	1,316,646	22,924	17,067
August	1,591,991	1,442,572	1,460,610	25,756	14,579
September	1,660,839	1,410,221	.....	15,151	.....
October	1,769,094	1,419,624	.....	8,500	.....
November	1,689,994	1,242,804	.....	9,032	.....
December	1,768,799	1,113,174	.....	12,178	.....

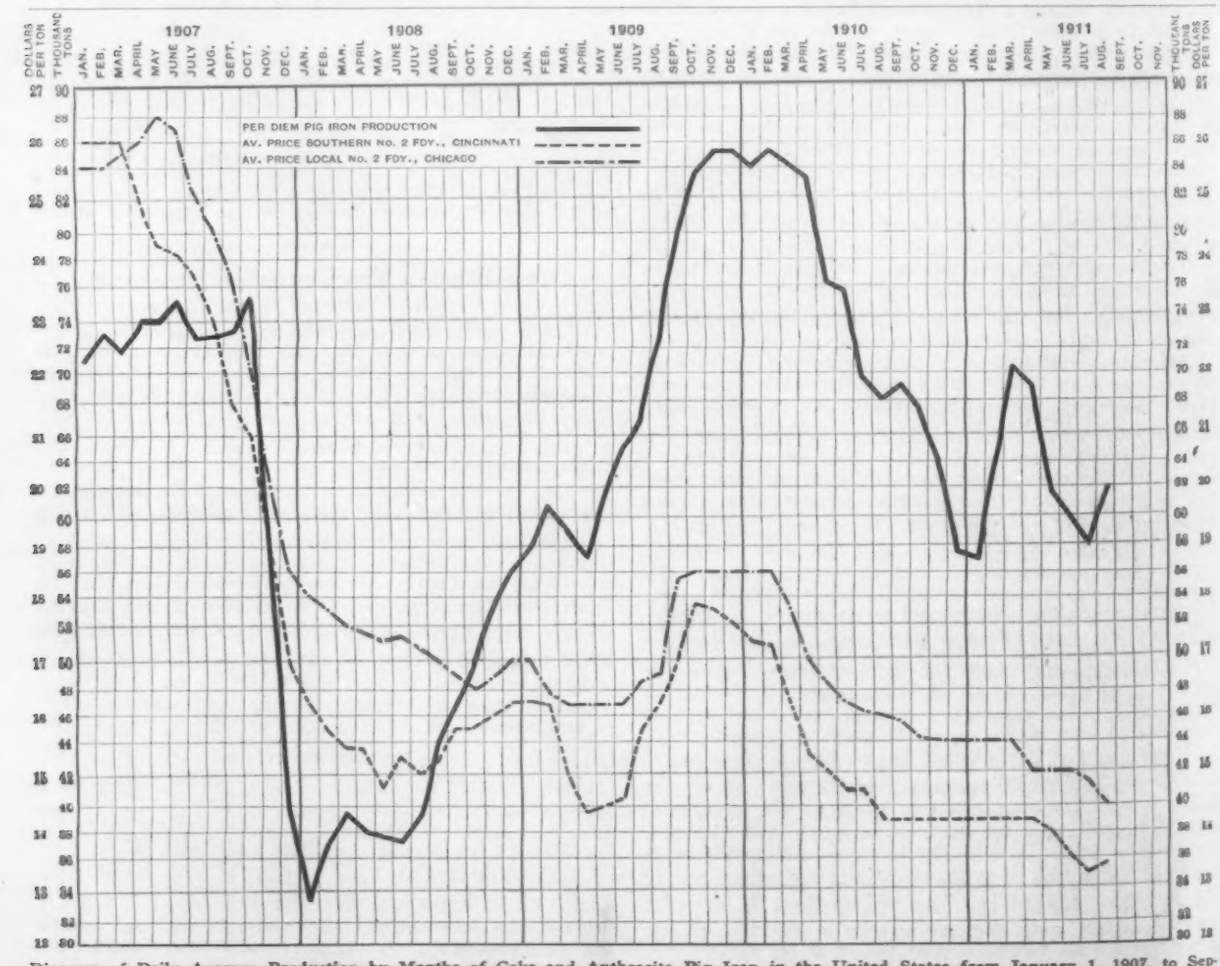

Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to September 1, 1911; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace.

Capacity in Blast September 1 and August 1

The following table shows the daily capacity of furnaces in blast September 1 and August 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces.	Total number of stacks.	Sept. 1 — Number in blast.	Sept. 1 — Capacity per day.	August 1 — Number in blast.	August 1 — Capacity per day.
New York:					
Buffalo	17	9	3005	10	3297
Other New York	7	3	621	3	585
New Jersey	7	0	0	0	0
Pennsylvania:					
Lehigh Valley	24	12	2317	12	2381
Spiegel	3	2	167	2	160
Schuylkill Valley	16	6	1722	6	1554
Lower Susquehanna	7	2	583	3	637
Lebanon Valley	10	4	635	4	616
Pittsburgh District	50	38	15,308	33	13,467
Spiegel	3	2	330	2	332
Shenango Valley	20	9	2773	9	2752
Western Pennsylvania	27	11	3108	11	3025
Maryland	4	3	750	3	752
Wheeling District	14	9	3051	9	3135
Ohio:					
Mahoning Valley	24	17	6450	16	6360
Central and Northern	23	11	4285	10	3942
Hocking Val., Hanging Rock & S. W. Ohio	15	2	235	2	230
Illinois and Indiana	32	21	9235	21	8742
Spiegel	2	1	52	1	60
Mich., Wis., and Minn.	10	5	970	4	744
Colorado, Mo. and Wash.	7	3	1080	3	1050
The South:					
Virginia	23	5	617	6	665
Kentucky	5	1	145	1	156
Alabama	46	19	4565	17	4175
Tenn. and Georgia	20	8	910	8	873
Total	416	203	62,914	196	59,690

Among furnaces blown out in August was one Wickwire at Buffalo, one Paxton in the lower Susquehanna Valley, and Princess in Virginia. Furnaces blown in in the month include three Edgar Thomson, one Clairton and one Isabella in the Pittsburgh district. Struthers in the Mahoning Valley, Upson in northern Ohio, one Mayville in Wisconsin, Alice and one Ensley in Alabama.

Chart of Pig Iron Production and Prices

The fluctuations in pig iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of *The Iron Age*. The two sets of figures are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907—Gross Tons.

	1907.	1908.	1909.	1910.	1911.
January	71,149	33,918	57,975	84,148	56,752
February	73,038	37,163	60,976	85,616	64,090
March	71,821	39,619	59,232	84,459	70,036
April	73,885	38,289	57,962	82,792	68,836
May	74,048	37,603	60,753	77,102	61,079
June	74,486	36,444	64,656	75,516	59,585
July	72,763	39,287	67,793	69,305	57,841
August	72,594	43,851	72,546	67,963	62,150
September	72,783	47,300	79,507	68,476	.....
October	75,386	50,554	83,856	67,520	.....
November	60,937	51,595	84,917	63,659	.....
December	39,815	56,158	85,022	57,349	.....

Monthly Average Prices in Dollars of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry at Chicago District Furnace Since January, 1907.

	1907.		1908.		1909.		1910.		1911.	
	Sou. No.2, Cin.	Loc. No.2, Chi.	Sou. No.2, Cin.	Loc. No.2, Chi.	Sou. No.2, Cin.	Loc. No.2, Chi.	Sou. No.2, Cin.	Loc. No.2, Chi.	Sou. No.2, Cin.	Loc. No.2, Chi.
Jan.	26.00	25.00	16.15	18.10	16.26	17.00	17.25	18.50	14.25	15.00
Feb.	26.00	25.50	15.75	17.81	16.13	16.40	17.06	18.50	14.25	15.00
Mar.	26.00	25.75	15.50	17.50	15.05	16.15	16.30	17.80	14.25	15.00
Apr.	25.06	26.00	15.20	17.38	14.25	16.15	15.37	17.00	14.25	15.00
May	24.25	26.50	14.75	17.28	14.50	16.15	15.00	16.56	14.00	15.00
June	24.10	26.25	15.25	17.38	14.70	16.15	14.85	16.25	13.50	15.00
July	23.85	25.20	15.00	17.20	15.75	16.65	14.75	16.06	13.25	14.87
Aug.	23.00	24.50	15.25	17.00	16.38	16.78	14.31	16.00	13.45	14.50
Sept.	21.50	23.75	15.65	16.70	17.35	18.35	14.25	15.90	....	....
Oct.	20.95	22.10	15.75	16.50	17.88	18.50	14.25	15.56	....	....
Nov.	19.50	20.31	16.00	16.75	17.75	18.50	14.25	15.50	....	....
Dec.	17.00	18.55	16.25	17.00	17.45	18.50	14.25	15.50	....	....

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907—Gross Tons.

	1907	1908	1909	1910	1911
Jan.	2,205,607	1,045,250	1,797,560	2,608,605	1,759,326
Feb.	2,045,068	1,077,740	1,707,340	2,397,254	1,794,509
Mar.	2,226,457	1,228,204	1,832,194	2,617,949	2,171,111
Apr.	2,216,558	1,149,602	1,738,877	2,483,763	2,064,086
May	2,295,505	1,165,688	1,883,330	2,390,180	1,893,456
June	2,234,575	1,092,131	1,930,866	2,265,478	1,787,566
July	2,255,660	1,218,129	2,103,431	2,148,442	1,793,068
Aug.	2,250,410	1,359,831	2,248,930	2,106,847	1,926,637
Sept.	2,183,487	1,418,998	2,385,206	2,056,275	.....
Oct.	2,336,972	1,567,198	2,599,541	2,093,121	.....
Nov.	1,828,125	1,577,854	2,547,508	1,909,780	.....
Dec.	1,234,279	1,740,912	2,635,680	1,777,817	.....

New Publications

Hendricks's Commercial Register of the United States. Size, 7¼ x 10¼ in.; pages, 1419. Cloth bound. Price, $10 net. Published by S. E. Hendricks Company, 74 Lafayette street, New York City.

The present or twentieth annual edition of this book is by far the most complete ever published. The index which last year required 99 pages, now contains nine more pages, and this extra matter represents manufacturers of over 3000 articles that have not appeared in previous issues. The total number of classifications is over 45,000, each representing manufacturers of or dealers in machines, tools, specialties and materials required in the architectural engineering, mechanical, electrical, railroad and kindred fields. This edition contains 77 pages more than the previous one and 47 pages of matter appearing in the last edition were omitted, which makes the total number of pages of new matter 124 and represents over 350,000 names and addresses.

While the simplicity of its classification has always been a feature of the Commercial Register, the classifications this year have been arranged in numerical order and the index refers directly to the numbers of the various classifications instead of to the page. The different classifications are all arranged so that the book may be used for either purchasing or mailing purposes. The general heading for mailing purposes is first given, under which all manufacturers of a particular trade are first classified and each of the firms or corporations appears again under as many classifications as every variety of its product calls for. An effort has been made to give after the names of the different firms information which would be of assistance to the buyer and save the expense of writing to a number of firms for a particular article desired. Trade names of all the articles classified are included as far as possible and appear in parenthesis between the names and addresses of the different firms appearing under the classifications.

Superior Special Charcoal Pig Iron.—The Superior Charcoal Iron Company, Grand Rapids, Mich., states that all its blast furnaces are now making the Superior Special brand of charcoal pig iron. These furnaces are the Pioneer, Elk Rapids, Antrim, Excelsior, Champion, Marquette, Michigan and Pine Lake. Not long ago the Lake Superior & Ishpeming Railroad ordered a lot of car wheels made entirely from this iron. The wheels were made without the use of ferromanganese, ferrosilicon or alloys of any kind in either cupola or ladle, the fuel used being standard Connellsville coke. The wheels were of the 33-in. M.C.B. 725-lb. type, No. 2 tape. They broke at the 115th blow under the regular M.C.B. drop test of 220 lb., falling 12 ft., the M.C.B. requirements for this test being 12 blows. These wheels are to be placed under engine tanks, where they will be subjected to the heaviest service. From the high strength shown and the intense hardness of the chill, they will undoubtedly give a high mileage.

The Sowers Mfg. Company, operating the H. W. Dopp Company, Buffalo, N. Y., has recently finished and has in complete running order a new machine shop and erecting building. The company is steadily broadening its lines of foundry and machine shop work and engineering and finds its business this year ahead of that of 1910 at the same date. The excellent business is ascribed to the fact that the company's apparatus is becoming better known and used by those who are seeking the utilization of certain by-products.

The Wickwire Steel Company, Buffalo, N. Y., blew out its Harriet X furnace last week for relining. It will be blown in as early as possible in October.

The blast furnace of the Ironton Iron Company, Ironton, Ohio, was blown in this week.

The Jackson Iron & Steel Company, Jackson, Ohio, is this week blowing in its furnace which has been idle since December, 1910.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Sept. 6, 1911.	Aug. 30, 1911.	Aug. 2, 1911.	Sept. 7, 1910.
PIG IRON, Per Gross Ton:				
Foundry No. 2 standard, Philadelphia	$15.00	$15.00	$15.00	$16.00
Foundry No. 2, Valley furnace.	13.50	13.50	13.50	13.75
Foundry No. 2 Southern, Cincinnati	13.50	13.50	13.25	14.25
Foundry No. 2, Birmingham, Ala.	10.25	10.25	10.00	11.00
Foundry No. 2, at furnace, Chicago*	14.50	14.50	14.50	16.50
Basic, delivered, eastern Pa....	14.75	14.75	14.50	15.00
Basic, Valley furnace.....	13.00	13.00	13.00	13.75
Bessemer, Pittsburgh	15.90	15.90	15.90	15.90
Gray forge, Pittsburgh.....	13.90	13.90	13.90	14.15
Lake Superior charcoal, Chicago	16.50	16.50	16.50	18.50
COKE, CONNELLSVILLE, Per Net Ton, at Oven:				
Furnace coke, prompt shipment.	1.50	1.50	1.45	1.60
Furnace coke, future delivery..	1.60	1.60	1.60	1.75
Foundry coke, prompt shipment.	1.85	1.85	1.85	2.15
Foundry coke, future delivery..	2.10	2.10	2.00	2.25
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh....	21.00	21.00	21.00	24.50
Forging billets, Pittsburgh.....	26.00	26.00	26.00	29.00
Open hearth billets, Philadelphia	23.40	23.40	23.40	27.00
Wire rods, Pittsburgh.....	27.00	27.00	27.00	28.00
OLD MATERIAL, Per Gross Ton:				
Iron rails, Chicago.....	14.00	14.00	14.00	16.00
Iron rails, Philadelphia.....	17.00	17.00	17.50	18.00
Car wheels, Chicago.....	13.00	13.00	12.75	14.00
Car wheels, Philadelphia.....	13.00	13.00	13.00	13.75
Heavy steel scrap, Pittsburgh..	13.00	13.00	13.25	14.25
Heavy steel scrap, Chicago.....	*10.50*	11.00	10.75	12.25
Heavy steel scrap, Philadelphia.	13.25	13.25	13.50	13.75
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia.	1.27½	1.27½	1.27½	1.40
Common iron bars, Pittsburgh..	1.25	1.25	1.25	1.45
Common iron bars, Chicago....	1.20	1.20	1.20	1.37½
Steel bars, Pittsburgh.....	1.20	1.20	1.20	1.40
Steel bars, tidewater, New York.	1.36	1.36	1.36	1.56
Tank plates, Pittsburgh.....	1.30	1.30	1.35	1.40
Tank plates, tidewater, New York	1.46	1.46	1.51	1.56
Beams, Pittsburgh	1.35	1.35	1.35	1.40
Beams, tidewater, New York...	1.51	1.51	1.51	1.56
Angles, Pittsburgh.....	1.35	1.35	1.35	1.40
Angles, tidewater, New York...	1.51	1.51	1.51	1.56
Skelp, grooved steel, Pittsburgh.	1.20	1.20	1.20	1.45
Skelp, sheared steel, Pittsburgh.	1.30	1.30	1.30	1.55
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	1.95	1.95	2.00	2.15
Wire nails, Pittsburgh†.....	1.65	1.65	1.70	1.70
Cut nails, Pittsburgh†.....	1.60	1.60	1.60	1.65
Barb wire, galv., Pittsburgh†...	2.00	2.00	2.00	2.00
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	12.75	12.75	12.75	12.87½
Electrolytic copper, New York..	12.50	12.50	12.62½	12.62½
Spelter, St. Louis.....	*5.80*	5.90	5.70	5.25
Spelter, New York.....	*6.00*	6.05	5.90	5.40
Lead, St. Louis.....	4.42½	4.42½	4.45	4.30
Lead, New York.....	4.50	4.50	4.50	4.40
Tin, New York.....	*41.25*	42.87½	42.00	36.20
Antimony, Hallett, New York..	7.75	7.75	8.00	7.87½
Tin plate, 100-lb. box, New York	$3.94	$3.94	$3.94	$3.84

* The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

† These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.30c. to 1.35c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

	Cents per lb.
Gauges under ¼ in. to and including 3-16 in. on thinnest edge, extra	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates) 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 100 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cuttings to lengths or diameters under 1 ft	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS—Net cash 30 days.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.35c. to 1.40c., net. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in	1.45 to 1.50
H-beams over 18 in	1.50 to 1.55
Angles, 3 to 6 in., inclusive, ¼ in. and up	1.35 to 1.40
Angles over 6 in	1.45 to 1.50
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras as per steel bar card Sept. 1, 1909	1.40 to 1.45
Tees, 3 in. and up	1.40 to 1.45
Zees, 3 in. and up	1.35 to 1.40
Angles, channels and tees, under 3 in., plus full extras as per steel bar card Sept. 1, 1909	1.40 to 1.45
Deck beams and bulb angles	1.65 to 1.70
Hand rail tees	2.45
Checkered and corrugated plates	2.45

Sheets.—Makers' prices for mill shipments on sheets of U. S. standard gauge, in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.35 to 1.40
Nos. 9 and 10	1.45 to 1.50
Nos. 11 and 12	1.50 to 1.55
Nos. 13 and 14	1.55 to 1.60
Nos. 15 and 16	1.65 to 1.70

One Pass, Cold Rolled, Box Annealed Sheets.

Nos. 10 to 12	1.60 to 1.65
Nos. 13 and 14	1.65 to 1.70
Nos. 15 and 16	1.70 to 1.75
Nos. 17 to 21	1.75 to 1.80
Nos. 22, 23 and 24	1.80 to 1.85
Nos. 25 and 26	1.85 to 1.90
No. 27	1.90 to 1.95
No. 28	1.95 to 2.00
No. 29	2.00 to 2.05
No. 30	2.10 to 2.15

Three Pass, Cold Rolled, Box Annealed Sheets.

Nos. 15 and 16	1.80 to 1.85
Nos. 17 to 21	1.85 to 1.90
Nos. 22 to 24	1.90 to 1.95
Nos. 25 and 26	1.95 to 2.00
No. 27	2.00 to 2.05
No. 28	2.05 to 2.10
No. 29	2.10 to 2.15
No. 30	2.20 to 2.25

Galvanized Sheets, of Black Sheet Gauge.

Nos. 10 and 11	1.95 to 2.00
Nos. 12, 13 and 14	2.05 to 2.10
Nos. 15, 16 and 17	2.20 to 2.25
Nos. 18 to 22	2.35 to 2.40
Nos. 23 and 24	2.45 to 2.50
Nos. 25 and 26	2.65 to 2.70
No. 27	2.80 to 2.85
No. 28	2.95 to 3.00
No. 29	3.05 to 3.10
No. 30	3.25 to 3.30

All above rates are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice, as also are the following base prices per square for painted and galvanized roofing sheets, with 2½-in. corrugations:

Gauge.	Painted.	Galvanized.	Gauge.	Painted.	Galvanized.
29	....	$2.40	23	$2.40	$3.50
28	$1.40	2.55	22	2.60	3.70
27	1.55	2.60	21	2.80	4.05
26	1.65	2.65	20	3.05	4.35
25	1.85	3.05	18	4.05	5.70
24	2.10	3.15	16	4.90	6.50

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Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1, 1910:

	Steel		Iron	
	Black.	Galv.	Black.	Galv.
Butt Weld.				
1 to 1½ in.	..	..	49	43
½ in.	75	63	71	59
¾ to 1½ in.	79	69	75	65
2 to 3 in.	80	70	76	66
Lap Weld.				
2 in.	76	66	72	62
2½ to 4 in.	78	67	74	64
4½ to 6 in.	77	67	73	63
7 to 12 in.	75	59	71	55
13 to 15 in.	51½	..	..	..
Butt Weld, extra strong, plain ends, card weight.				
½, ¼, ⅜ in.	69	59	65	55
½ in.	74	68	70	64
¾ to 1½ in.	78	72	74	68
2 to 3 in.	79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.	75	69	71	65
2½ to 4 in.	77	71	73	67
4½ to 6 in.	76	70	72	66
7 to 8 in.	69	59	65	55
9 to 12 in.	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
½ in.	64	58	60	54
¾ to 1½ in.	67	61	63	57
2 to 3 in.	69	63	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.	65	59	61	55
2¼ to 4 in.	67	61	63	57
4½ to 6 in.	66	60	62	56
7 to 8 in.	59	49	62	56

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld
2, 2½ to 4 in. Lap Weld

} will be sold at two (2) points lower basing (higher price) than merchants' or card weight pipe. Butt or lap weld, as specified.

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are as follows:

	Steel
1¼ to 2¼ in.	65
2½ in.	67½
2¾ to 3¼ in.	70
3½ to 4½ in.	72½
5 to 6 in.	65
7 to 13 in.	62½

Less than carloads to destination east of the Mississippi River will be sold at delivered discounts for carload lowered by two points for lengths 22 ft. and under; longer lengths f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, $27. Fence wire, Nos. 0 to 9 per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, $1.50; galvanized, $1.80. Carload lots, to retailers, annealed, $1.55; galvanized, $1.85. Galvanized bar wire to jobbers, $2; painted, $1.70. Wire nails, to jobbers, $1.65.

The following table gives the price to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 lb.

No.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.65	$1.70	$1.75	$1.80	$1.90	$2.00	$2.10	$2.20
Galvanized	1.95	2.00	2.05	2.10	2.20	2.30	2.70	2.80

Market and Stone Wire in Bundles, Discount from Standing List.

Bright and Annealed:	
9 and coarser	80
10 to 18	80 and 10
19 to 26	80 and 10 and 2½
27 to 36	80 and 5
Galvanized	
9 and coarser	75 and 10
10 to 16	75 and 10
17 to 26	72½ and 10
27 to 36	72½
Coppered or Liquor Finished:	
9 and coarser	75 and 10
10 to 26	75 and 10
27 to 36	70 and 10 and 5
Tinned:	
6 to 18	75 and 10 and 10

Pittsburgh

PITTSBURGH, PA., September 6, 1911.—*(By Telephone.)*

Pig Iron.—The largest new inquiry in this district or nearby territory is that of a Canton consumer for 3500 tons of basic for delivery this year. We also note an inquiry from a local consumer for 1000 tons of foundry iron for the last quarter and the same tonnage for the first quarter of next year. Local consumers of pig iron are pretty well covered for the remainder of this year and have not yet sent out inquiries for the first quarter or the first half of next year. The average price of Bessemer iron in August was $15 and of basic $13 at Valley furnace. We quote as follows: Bessemer, $15; basic, $13 for early delivery and $13.25 for extended delivery; No. 2 foundry, $13.50 to $13.75; malleable, $13.25 to $13.50; gray forge, $13, all at Valley furnace, the freight rate to Pittsburgh being 90c.

Steel.—Specifications against contracts for billets and sheet and tin bars are reported as coming in very freely, but there is no new inquiry, as consumers are covered by contract. Some of the smaller open hearth steel concerns are shading regular prices on billets and bars about $1 a ton on small lots for prompt delivery. We quote Bessemer and open hearth billets, 4 x 4 in. and up to but not including 10 x 10 in., $21 base, and sheet and tin bars in 30-ft. lengths, $22; 1½-in. billets, $22; forging billets, $26, base, usual extras for sizes and carbons, all prices being f.o.b. Pittsburgh or Youngstown district, with freight to destination added.

Rails.—The Carnegie Steel Company has sold to a local railroad 7000 tons of standard sections for prompt shipment and has also received other orders for about 4000 tons for early delivery. This concern also reports a fairly heavy inquiry for track supplies of all kinds, with large sales of splice bars.

(By Mail.)

The month of August made a better showing in the iron trade than July. While it has been dull so far this month, there is strong hope that it will show up equally well, and possibly be a little better. The rail and billet sales department of the Carnegie Steel Company reports that its orders and specifications sent to the mills for rolling in August exceeded those of July by a good many thousand tons; although a good part of this business is for export, yet the domestic business last month showed an increase over July. New orders for finished iron and steel are only for actual needs of consumers, and jobbers are carrying as light stocks as possible. The mills are naming such prices as they think are necessary to get what business is being offered, and the present market is altogether in favor of the buyer. There have been no drastic cuts in prices as yet, but there is more disposition to shade figures, and this is causing buyers to place orders very cautiously. The recent cut of $1 a ton in wire products has not resulted in any marked increase in business, and this would probably be the result if open cuts were made on other products. It looks as though it would be a waiting game for some little time, but no serious price disturbances are expected. The scrap trade is stagnant and so is coke, with prices only fairly steady.

Ferromanganese.—No sales are reported. Prices are only fairly strong, the metal having been sold recently at less than $37, Baltimore, for the first half of next year. We quote foreign 80 per cent. at $36.50 for the remainder of the year and about $37 for first half of 1912, the freight rate to Pittsburgh district being $1.95 a ton.

Ferrosilicon.—Consumers who had inquiries out are not closing, on account of the higher prices asked by sellers. We continue to quote 50 per cent. ferrosilicon at $53 to $54 and blast furnace silicon as follows: 10 per cent., $23; 11 per cent., $24; 12 per cent., $25, f.o.b. cars Ashland and Jisco furnaces.

Muck Bar.—A sale of 500 tons of high-grade muck bar is reported at a price equal to about $29, Pittsburgh. We quote best grades made from all pig iron at $28.50 to $29, Pittsburgh. Some makes of bar from outside makers are offered at slightly lower prices.

Skelp.—No sales are reported and there is no new inquiry. Prices are only fairly strong. We quote: Grooved steel skelp, 1.20c.; sheared steel skelp, 1.30c.; grooved iron skelp, 1.45c. to 1.55c., and sheared iron skelp, 1.65c. to 1.70c., all for delivery at consumers' mills in the Pittsburgh district.

Wire Rods.—The market is very dull and prices are weak. We quote Bessemer, open hearth and chain rods at $27, Pittsburgh, but on a firm offer this price would no doubt be shaded.

Steel Rails.—Some new business in standard sections is about ready to be placed, and may be given out this week. The Carnegie Steel Company is having quite a good business in light rails, especially from the coal companies, and last week received new orders and specifications for about 3500 tons. Prices on light rails are as follows: 12-lb., 1.25c.; 16, 20 and 25-lb., 1.21c. to 1.25c.; 30 and 35-lb., 1.20c., and 40 and 45-lb., 1.16c. These prices are f.o.b. at mill, plus freight, and are the minimum of the market in carload lots, small

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lots being sold at a little higher price. Standard sections are held at 1.25c. per lb. for Bessemer.

Plates.—The situation in the plate trade is quiet, with no large business pending. The Monon Railroad is asking prices on 1000 steel gondola cars, the Erie on 200 refrigerator cars, the Baltimore & Ohio on 10 steel postal cars, 10 steel baggage cars and the Vandalia Lines on 47 steel underframe box cars. The McKees Rocks Works of the Pressed Steel Car Company is running to only about 30 per cent. of capacity, while the Standard Steel Car Company is running its Butler plant to about 50 per cent. of capacity. Prices on plates continue somewhat weak and 1.30c. is being named on desirable orders. We quote ¼-in. and heavier plates at 1.30c. to 1.35c., f.o.b. Pittsburgh.

Structural Material.—The actual bookings of the American Bridge Company in August were much the heaviest in any one month this year, and it is said to be filled up with work for the next six months. As a result of this, prices are a little stronger, the other fabricating concerns asking higher figures on work to be erected in the next two or three months, and on which they are able to guarantee deliveries. We quote beams and channels up to 15-in. at 1.35c., Pittsburgh.

Sheets.—General conditions are fairly satisfactory, as far as new demand and specifications against contracts go, but there is still considerable unevenness in prices. The mills have been going after new business more aggressively. In most cases concessions are not more than $1 a ton, but where desirable sizes are involved, and prompt specifications are furnished by the buyer, prices are being shaded $2 per ton. As a rule the leading sheet mills are operating to about 70 to 75 per cent. of capacity. Shipments of sheets by the mills in August showed an increase over July. We give on a previous page a table of prices f.o.b. mill on the various grades of sheets.

Tin Plate.—There is practically no new buying of tin plate, as the season is over. Specifications from the can makers are coming in quite freely, but not as heavy as some time ago. At present the American Sheet & Tin Plate Company is operating to about 80 per cent. of capacity and the independent mills as a rule are operating at about the same rate. The Jones & Laughlin Steel Company will soon complete its second unit of tin plate mills at Aliquippa, which will make a total of 24 mills. There are now about 150 hot tin mills operated by the independent plants. On desirable new business for delivery late this year or early in 1912 the tin plate mills are making a price of $3.60 per base box. We quote 100-lb. cokes for early shipment at $3.70 per base box f.o.b. Pittsburgh, but on new orders for late delivery $3.60 per base box is being named.

Bars.—The heavy buying in steel bars is pretty well over, most consumers having covered by contracts for their supply for some months ahead. The implement makers are specifying fairly well against contracts, but the wagon builders are not taking out their bars as promptly as desired. Prices continue somewhat weak and 1.20c. is being named by most of the steel bar makers on desirable orders. The new demand for iron bars is very dull and specifications against contracts are unsatisfactory. We quote steel bars at 1.20c. to 1.25c. and iron bars at 1.25c. to 1.30c., Pittsburgh.

Merchant Steel.—New orders and specifications in August were somewhat heavier than in July, but fell off to some extent in the latter part of the month. Prices are being more or less shaded. Regular quotations are as follows: Iron finished tire, ¼ x ½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Hoops and Bands.—The makers report that actual orders and specifications against contracts in August were a little better than in July. It is said that in some cases bands have sold below the 1.25c. price and that 1.40c. on steel hoops has also been shaded. We quote steel hoops at 1.40c. and bands at 1.25c., extras on the latter as per the steel bar card.

Rivets.—There is only a fair new demand, consumers placing only such orders for rivets as are wanted to meet current needs. Specifications against contracts are not very good and prices in some cases are being shaded. We quote structural rivets at 1.70c. to 1.75c. and boiler rivets at 1.80c. to 1.85c., but these prices are not always obtained.

Wire Products.—The recent cut of $1 per ton on wire products has not brought out any large increase in new business, jobbers and consumers still buying only such quantities of nails and wire as are absolutely needed to meet current wants. Stocks held by jobbers are light and a more active buying is expected as fall approaches. Regular prices, which are openly shaded $1 per ton, are as follows: Galvanized barb wire, $2 per 100 lb.; painted, $1.70; annealed fence wire, $1.50; galvanized, $1.80; wire nails, $1.70 and cut nails, $1.60, all f.o.b. Pittsburgh, with full freight added to point of delivery.

Spelter.—Prices have shown a heavy decline in the past week, and we quote prime grades of Western at 5.70c., East St. Louis, equal to 5.82½c., Pittsburgh. New demand is reported to be light.

Shafting.—New demand and specifications are only for small lots to cover actual needs. The recent cutting in prices has not stimulated demand, and the present situation in this product is very unsatisfactory. We quote shafting in carload and larger lots at 60 and 7½ to 60 and 10 per cent. off regular list, delivered in base territory.

Railroad Spikes.—The demand is only for small lots for repair work. Some time ago some fairly large contracts for spikes were placed, but the railroads are not specifying very freely against these contracts. We quote railroad spikes at $1.50 per 100 lb., base sizes, f.o.b. Pittsburgh.

Merchant Pipe.—Three or four of the leading pipe mills report shipments in August as having been heavier than in July, and also larger than in the same month last year. No large contracts for gas or oil lines have been placed since our last report, but several of these projects are under way and may develop in the very near future. Mills report that the demand for merchant pipe is fairly heavy and the leading pipe mills are operating to about 70 per cent. of capacity. There is some shading in prices of iron and steel pipe, but not more than usual when the demand is only fairly active. We give on a previous page regular discounts on pipe and boiler tubes.

Boiler Tubes.—While there is a little better new demand for railroad tubes, the general condition of the tube trade is very unsatisfactory, and has been for some months.

Coke.—Trade is very quiet. While there is some inquiry for furnace coke for delivery over the next month or two, intending buyers are very slow in closing. We note a sale of about 5000 tons of standard furnace coke for September shipment at $1.50 per net ton at oven. The output in the upper and lower Connellsville regions last week was 332,157 tons, an increase over the previous week of 18,435 tons. We quote standard makes of furnace coke for prompt shipment at $1.50, and for remainder of the year at $1.60 to $1.65 per net ton at oven. We quote standard 72-hr. foundry coke for prompt shipment at $1.85 to $1.90, and for future delivery at $2.10 up to $2.25 per net ton, at oven.

Iron and Steel Scrap.—Dealers now report that it is easier to get scrap than it is to sell it. An embargo is on scrap routed to one of the largest consumers in this district, while another is expected to declare an embargo any day. The steel mills are operating to larger capacity than they were a month ago, and yet they are not taking in scrap as freely as they did some time ago. Prices are weak. Dealers now quote as follows, per gross ton, f.o.b. Pittsburgh, unless otherwise noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	$13.00
No. 1 foundry cast	$13.25 to 13.50
No. 2 foundry cast	12.75 to 13.00
Bundled sheet scrap, f.o.b. consumers' mill, Pittsburgh district	11.25 to 11.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	13.50 to 13.75
No. 1 railroad malleable stock	12.75 to 13.00
Grate bars	10.75 to 11.00
Low phosphorus melting stock	15.75 to 16.00
Iron car axles	23 00 to 23.50
Steel car axles	17.50 to 18.00
Locomotive axles	23.00
No. 1 busheling scrap	12.00 to 12.25
No. 2 busheling scrap	8.50 to 8.75
Old car wheels	13.00 to 13.25
Sheet bar crop ends	15.25 to 15.50
*Cast iron borings	9.25
*Machine shop turnings	9.50
Old iron rails	15.50 to 15.75
No 1 wrought scrap	13.50 to 14.00
Heavy steel axle turnings	10.00 to 10.25
Stove plate	10.50 to 10.75

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

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Chicago

CHICAGO, ILL., September 6, 1911.—*(By Telegraph.)*

In this district the month of August failed to justify the hopes of larger tonnages as compared with June and July. While the bookings of last month did not fall off greatly, the aggregate of orders for rails, plates and bars, as compared with those of the preceding months, showed a decrease too large to be overcome by the well-maintained volume of structural business. Pig iron sales were likewise very light. As contrasted with an optimistic tone at the beginning of the month, the market now represents the aspect of making the best of an unsatisfactory situation. Shading of prices on sheets and steel bars continues especially pronounced, while the firmness of iron bars, plates and wire products is maintained with difficulty. The market for old material has weakened somewhat. The continuance of adverse rate rulings and the recent demands made upon the railroads by labor organizations, against which a firm stand is apparently to be made, have been coincident with a perceptible falling off in railroad expenditures. This seems to apply particularly to rolling stock, aside from locomotives, for which limited orders have been placed by several Western roads.

Pig Iron.—The past week brought out comparatively few sales, and nearly all of the business consisted of spot shipments in carload lots. For such business a price of $10, Birmingham, for No. 2 Southern has been obtainable without great difficulty. For forward shipment the price continues to be $10.50. Furnaces are quoting $11 for first quarter delivery, but this price has not proved interesting to consumers. Local iron can be moved only within narrow limits, and then only at prices very unattractive to the furnace. We quote for Chicago delivery, except for local irons, which are f.o.b. furnace, the following prices:

Lake Superior charcoal	$16.50 to $17.00
Northern coke foundry, No. 1	15.00 to 15.50
Northern coke foundry, No. 2	14.50 to 15.00
Northern coke foundry, No. 3	14.25 to 14.50
Northern Scotch, No. 1	16.00
Southern coke, No. 1 foundry and No. 1 soft	15.10
Southern coke, No. 2 foundry and No. 2 soft	14.60
Southern coke, No. 3	14.35
Southern coke No. 4	14.10
Southern gray forge	13.85
Southern mottled	13.85
Malleable Bessemer	14.50 to 15.00
Standard Bessemer	17.40
Basic	15.50
Jackson Co. and Kentucky Silvery, 6 per cent	17.90
Jackson Co. and Kentucky Silvery, 8 per cent	18.90
Jackson Co. and Kentucky Silvery, 10 per cent	19.90

Structural Material.—The lettings for fabricated structural steel reported as placed in the past week totaled only 1500 tons and were scattered over a wide area. A building for Hegeler Brothers, Danville, Ill., will require 312 tons; the Masonic Temple at Des Moines, Iowa, 614 tons; a bank building at Jacksonville, Ill., 255 tons, and three jobs in California, two bridges and a courthouse, about 100 tons each. Competition among fabricators is not quite so keen, and there is correspondingly less pressure on the price of plain material. We quote plain material, mill shipment, for Chicago delivery, at 1.53c., and from store, 1.75c.

(By Mail.)

Rails and Track Supplies.—In the matter of rails and new car equipment the railroads seem to have entered upon another period of strict retrenchment. Rail sales in this market in the past week covered an exceedingly meagre tonnage. From South and Southwestern territory the Ensley plant of the leading interest has drawn a more satisfactory volume, and on the basis of 50,000 tons monthly this mill has on its books about three months' rolling. A number of the inquiries for new cars upon which expectations of considerable business were based have been withdrawn. The unsettled labor situation in the West is held to be responsible in large measure for the present attitude. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.10c. to 2.20c., base, all in carload lots, Chicago; standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c.; angle bars, 1.50c. to 1.60c., Chicago.

Plates.—Specifications for bridge material for railroad work have not been subject to curtailment in as marked degree as other supplies, and the plate tonnage carried in this business has prevented any very large decrease in the tonnage placed in August as compared with June and July. However, a slight falling off is noted. Contract tonnage has supported the price situation as to plates, but for miscellaneous business moderate concessions are not entirely lacking. We quote for Chicago delivery from mill, 1.53c.; from store, 1.75c.

Sheets.—While the larger sheet mills continue to receive orders sufficient to keep in operation a large part of their total capacity, enough tonnage is not available to admit of their forfeiting business rather than meet concessions. The shading of $1 to $2 per ton for which the smaller mills are for the most part primarily responsible becomes, as a result, quite general. At the same time there is not so much a shading of the base price as a relinquishing of freight advantages. We quote for Chicago delivery: Carload lots, from mill: No. 28 black sheets, 2.18c.; No. 28 galvanized, 3.18c.; No. 10 blue annealed, 1.68c. Prices from store, Chicago, are: No. 10, 1.95c. to 2.05c.; No. 12, 2c. to 2.10c.; No. 28 black, 2.45c. to 2.55c.; No. 28 galvanized, 3.45c.

Bars.—The manufacturers of bar iron have undoubtedly assumed a firmer stand with references to prices and upon the exceedingly reasonable basis that the low prices recently prevailing meant a direct loss. At the same time the order which will just fill out a rolling is pretty likely to bring out the price necessary to take it, particularly if it calls for extras. Steel car business is slightly decreased in volume, and as a result no change in the direction of firmer prices is manifested. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.43c.; bar iron, 1.20c. to 1.25c.; hard steel bars, rolled from old rails, 1.20c. From store, soft steel bars, 1.70c. to 1.80c., Chicago.

Old Material.—With the largest consumer of heavy melting steel in the market asking for delays in shipments, and other melters confining their purchases within narrow limits, the local scrap market is dull, with slightly lower prices. The accumulation of railroad and country scrap, the quick unloading of which on this market is possible though not considered imminent, is exerting an adverse influence. Railroad offerings in the current week were small, including 100 tons from the Chicago & Alton and 750 tons from the Wabash. We have modified our prices and quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, per gross ton, as follows:

Old iron rails	$14.00 to $14.50
Old steel rails, rerolling	12.75 to 13.25
Old steel rails, less than 3 ft	11.50 to 12.00
Relaying rails, standard sections, subject to inspection	24.00
Old car wheels	13.00 to 13.50
Heavy melting steel scrap	10.50 to 11.00
Frogs, switches and guards, cut apart	10.50 to 11.00
Shoveling steel	10.25 to 10.75
Steel axle turnings	8.50 to 9.00

The following quotations are per net ton:

Iron angles and splice bars	$12.50 to $13.00
Iron arch bars and transoms	13.75 to 14.25
Steel angle bars	10.25 to 10.75
Iron car axles	18.00 to 18.50
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	10.75 to 11.25
No. 2 railroad wrought	9.75 to 10.25
Steel knuckles and couplers	10.25 to 9.75
Locomotive tires, smooth	15.00 to 15.50
Machine shop turnings	6.25 to 6.75
Cast and mixed borings	6.00 to 6.50
No. 1 busheling	8.75 to 9.25
No. 2 busheling	6.75 to 7.25
No. 1 boilers, cut to sheets and rings	7.50 to 8.00
Boiler punchings	12.00 to 12.50
No. 1 cast scrap	10.50 to 11.00
Stove plate and light cast scrap	9.00 to 9.50
Railroad malleable	10.25 to 10.75
Agricultural malleable	9.25 to 9.75
Pipes and flues	8.00 to 8.50

Wire Products.—Reports of shading of prices from sources more or less vague have had a disturbing influence on a situation which gave promise of developing satisfactorily with the beginning of fall trade. While the buying of stocks may be somewhat retarded thereby, the opinion prevails, based upon the relatively good tonnage being booked, that an active season in wire nails and fence wire, at least, may be expected. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows. Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.88c.; painted barb wire, 1.88c.; galvanized, 2.18c.; polished staples, 1.88c.; galvanized, 2.18c., all Chicago.

Cast Iron Pipe.—The volume of country orders for pipe has been the mainstay of the past week, including small town lettings of from 100 to 200 tons. The Santa Fe and Oregon Short Line railroads were purchasers of small tonnages. At Muskegon, Mich., the

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letting of 7000 tons of pipe from 6 to 48 in. is appointed for this week. Pipe plants are well filled up on some sizes, particularly 4-in., the price of which is decidedly firmer. We quote as follows, per net ton, Chicago: Water pipe, 4-in., $26.50; 6 to 12-in., $24.50; 16-in. and up, $24, with $1 extra for gas pipe.

Philadelphia

PHILADELPHIA, PA., September 5, 1911.

The local market has been without special feature. Most of the business transacted has been in small lots for near future delivery, although some buyers would contract for extended shipment if sellers were agreeable. The pig iron movement has been confined to the foundry grades, which are being sold at unchanged prices. Structural material continues the most active of the finished material lines, although good business is ahead in heavy plates. Steel bars, while nominally quoted at 1.40c., are being sold at 1.35c., delivered, and refined iron bars, nominally quoted at 1.20c., mill, have been shaded. The old material market presents a waiting appearance, with prices still weak.

Iron Ore.—Negotiations for a considerable quantity of Swedish ore are still under way. Efforts to introduce a new Norwegian ore in this country are also noted. Very little business is reported in domestic ores, and the market generally is quiet.

Pig Iron.—Sales aggregate a fair total, but are confined almost exclusively to the foundry grades and made up principally of small orders, few being above 300 tons, and are mostly for early shipment. While the general range of prices for standard brands of Eastern foundry grades remains unchanged reports are current that the recent inside figure has been shaded on some brands. This, however, is not applicable to deliveries in this immediate vicinity, but rather at points where favorable freight rates are available and the buyer is given the benefit of a few cents difference in freight charges. An inquiry from a stove foundry for 2000 tons for this year's delivery is in the market. Deliveries on all grades of foundry iron continue to be taken freely and in instances are being urged, which is taken as indicating that consumers are not very well supplied beyond their immediate wants. The movement in Virginia foundry irons has been light; for delivery during the current month $12.25, furnace, can be done, although some producers continue to sell at $12.50. For shipment over the remainder of the year the majority of the sellers still hold at $12.50, furnace. Cast iron pipe makers continue in the market for low grade iron; one Delaware River interest has purchased practically 1000 tons of special analysis iron for early delivery, while negotiations are pending for several round lots. No movement in forge iron is reported, although good inquiries, based on possible business in rolled products, are reported. Steel making grades are quiet. No further inquiry has developed for basic iron and transactions in low phosphorus grades have been small. The following range of quotations is named for standard brands, delivered in buyers' yards in this vicinity, shipment ranging from prompt to the remainder of the year:

Eastern Pennsylvania No. 2 X foundry	$15.00 to $15.25
Eastern Pennsylvania No. 2 plain	14.75 to 15.00
Virginia foundry	15.00 to 15.50
Gray forge	14.25 to 14.50
Basic	14.75 to 15.00
Standard low phosphorus	20.00 to 20.50

Ferroalloys.—Some little movement in ferromanganese for early delivery is reported, one lot of 350 tons to a consumer in this district going at $37, Baltimore. Heavy inquiry from the West is in hand, and it is said that one round lot for next year's delivery has been closed. A sale of 125 tons of 50 per cent. ferrosilicon is reported at $57, with some sellers now asking $58. Furnace ferrosilicon is quiet at unchanged prices.

Billets.—The demand has been extremely light. No interest is reported in large quantities for extended shipment. Ordinary business still commands full prices, $23.40, delivered, for open-hearth rolling billets, and $28.40 for ordinary forging billets, but the market has not been tested recently by any sizable inquiries.

Plates.—A fair volume of specifications against current orders is noted, but there has been little new business of importance placed. Plate makers are encouraged by heavy inquiries for ship plates, previously noted, and look forward to a more active general buying movement in the near future. With several makers orders taken during August are reported to have been larger in the aggregate than those taken the previous month. For ordinary plates 1.50c., delivered here, continues to be named.

Structural Material.—The principal item of interest in this vicinity is the new municipal convention hall for which the early estimates as to structural material requirements have been found to be low. Bids for the steel work, which went in a few days ago, show requirements to have been between 11,000 and 13,000 tons. Few contracts were closed by fabricators last week; only small building work was contracted for and a moderate amount of bridge work. While fabricated prices continue very low, mills still maintain the 1.50c., delivered, basis for plain shapes.

Bars.—The uncertainty as to prices of both steel and iron bars continues. A nominal quotation of 1.40c., delivered, for steel bars is still heard of, but 1.35c., delivered, is readily being done for carload lots. Makers of refined iron bars are endeavoring to hold the recent 1.20c., Eastern mill, price, but lower quotations have been made, although but few producers are willing to shade that figure. Much, however, depends on the desirability of the specification, and for ordinary business 1.27½c. to 1.32½c., delivered, continues to be named.

Sheets.—New business comes out slowly and is confined to small prompt lots. Eastern mills are not operating at much better than 75 per cent. of capacity, and orders ahead are light. Eastern makers maintain recent quotations, which are materially higher than those named for Western sheets.

Coke.—A moderate amount of business has been contracted for in both foundry and furnace grades. A few contracts for foundry coke have been made for deliveries running from four to six months, at prices recently current. In furnace coke transactions have been largely confined to prompt and near future requirements. Spot coke is a trifle less plentiful and, while prices have not advanced, there is a narrower range of quotations on some brands. The following prices, per net ton, are quoted for deliveries in this vicinity:

Connellsville furnace coke	$3.75 to $3.95
Foundry coke	4.25 to 4.60
Mountain furnace coke	3.35 to 3.55
Foundry coke	3.85 to 4.20

Old Material.—The market drags and prices continue to show weakness. Consumers are pretty well supplied with material and take on only bargain lots, making but few offers. Not many sellers will dispose of their holdings at the prices named, awaiting developments. Railroad lists now out represent about an average quantity of old material, for which bids will no doubt be materially lower than last month. Bids for the scrap on the Panama Canal will be opened today, and the announcement of prices named is being awaited with interest. It is said that the government's estimate as to tonnage on the ground has been too high. The following range of prices, while largely nominal, about represents the basis at which business could be done for delivery in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate from Philadelphia varying from 35c. to $1.35 per gross ton, for shipment ranging from prompt to the remainder of the year:

No. 1 railroad heavy melting steel scrap	$13.25 to $13.50
Yard heavy melting steel scrap	12.75 to 13.00
Old steel rails, rerolling (nominal)	14.00 to 14.50
Low phosphorus heavy melting steel scrap	16.75 to 17.25
Old steel axles (nominal)	19.50 to 20.00
Old iron axles (nominal)	24.50 to 25.00
Old iron rails	17.00 to 17.50
Old car wheels (nominal)	13.00 to 13.50
No. 1 railroad wrought	15.50 to 16.00
Wrought iron pipe	12.50 to 13.00
No. 1 forge fire	11.00 to 11.50
No. 2 light iron (nominal)	6.75 to 7.25
Wrought turnings	8.50 to 9.00
Cast borings	8.00 to 8.50
Machinery cast	13.00 to 13.50
Railroad malleable (nominal)	11.50 to 12.00
Grate bars, railroad	10.00 to 10.50
Stove plate	10.00 to 10.50

Cincinnati

CINCINNATI, OHIO, September 6, 1911.—*(By Telegraph.)*

Pig Iron.—The market is devoid of any snap. Inquiries dwindled to almost the zero mark, as compared with normal conditions, but in spite of this Southern producers especially seem to realize that any concessions would not bring out business and are said to be firm in maintaining prices. A few small lots of South-

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ern No. 2 foundry have been taken by central Western consumers for delivery this year at $10.25, Birmingham, and there are also other sales recorded, covering carload lots, at $10.50. A northern Ohio melter contracted for 300 tons of Northern No. 2 foundry for last quarter delivery at $13, Ironton, and a few smaller orders were booked around the same figure for prompt shipment. About 100 tons of 8 per cent. silicon iron for fourth quarter movement was taken by a central Ohio consumer at $16 at furnace. Only a perfunctory interest is taken in next year's business, and it is rather problematical as to when the furnaces will open their books for that delivery. Prices made so far have been prohibitive, and if the present apathetic feeling prevails much longer it will develop probably an unprecedented situation in the inability of both buyer and seller to get together at this season for the coming year's requirement. Malleable continues dull and is quoted around $13.25, Ironton. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	$14.00 to $14.25
Southern coke, No. 2 foundry and 2 soft	13.50 to 13.75
Southern coke, No. 3 foundry	13.00 to 13.25
Southern coke, No. 4 foundry	12.75 to 13.00
Southern gray forge	12.75 to 13.00
Ohio Silvery, 8 per cent. silicon	16.95 to 17.20
Lake Superior coke, No. 1	14.70 to 14.95
Lake Superior coke, No. 2	14.20 to 14.45
Lake Superior coke, No. 3	13.70 to 13.95
Basic, Northern	14.20 to 14.45
Standard Southern car wheel	25.50 to 25.75
Lake Superior car wheel	19.00

(By Mail.)

Coke.—It is reported that a furnace interest in the Hanging Rock district has contracted for about 7000 tons of 48-hr. coke, for shipment during the remainder of this year. There is practically no inquiry for foundry grades, and sales are confined to very small lots. Prices are unchanged in all three fileds, with Wise County and Pocahontas furnace grades being held around $1.60 to $1.65 per net ton at oven for prompt shipment, with 10c. to 20c. per ton added for future delivery. Connellsville 48-hr. coke is obtainable as low as $1.50 for immediate shipment, but contract figures are higher. Foundry coke is quoted all the way from $2 to $2.35 per net ton, at oven, in all three districts.

Finished Material.—Structural material is holding up fairly well, but other lines are simply drifting along, and while orders are probably as numerous as ever they mostly call for small tonnages. Warehouse prices are firm at 1.70c. for steel bars and around 1.80c. per lb. for structural material. Railroad track material is in poorer demand.

Old Material.—Prices continue to show weakness, and the indifferent attitude of both buyer and seller does not help out the situation. Not much scrap is moving now, though an improvement is looked for before the month is up. The approximate prices paid by buyers delivered in their yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton	$10.25 to $10.75
Casting borings, net ton	4.50 to 5.00
Steel turnings, net ton	5.50 to 6.00
No. 1 cast scrap, net ton	9.25 to 9.75
Burnt scrap, net ton	6.25 to 6.75
Old iron axles, net ton	16.25 to 16.75
Bundled sheet scrap, gross ton	7.25 to 8.25
Old iron rails, gross ton	13.25 to 13.75
Relaying rails, 50 lb. and up, gross ton	20.75 to 21.50
Old car wheels, gross ton	10.00 to 10.50
Heavy melting sheet scrap, gross ton	9.75 to 10.25

Cleveland

CLEVELAND, OHIO, September 5, 1911.

Iron Ore.—Ore shipments for the season up to September 1 were 19,301,846 tons. That is a falling off of 9,525,183 tons as compared with the same period last year. The August movement was 5,548,311 tons. This is an increase of 326,738 tons over July. A falling off is expected in September and the movement after October will be very light. Last year shipments from September 1 till the end of the season aggregated 13,793,161 tons. With a similar movement the remainder of this season the total shipments for the year would aggregate 33,000,000 tons. While there are some predictions that the movement will reach 32,000,000, the opinion is more general that it will scarcely exceed 30,000,000 tons. The market remains inactive, the only sales reported being two small lots. No sales of importance are expected for the remainder of the season. We quote prices as follows: Old range Bessemer, $4.50; Mesaba Bessemer, $4.25; old range non-Bessemer, $3.70; Mesaba non-Bessemer, $3.50.

Pig Iron.—The United Steel Company, Canton, Ohio, has an inquiry out for 3500 tons of basic iron, 500 tons for September delivery and 1000 tons per month during the last three months. Two local foundries are in the market for 1000 tons of foundry iron each, one wanting it for the last quarter and the other for the first half. While the market is not active, a number of sales of small lots of foundry iron for delivery during the last quarter are reported. Some of the furnace interests are declining to quote prices for delivery after January 1, but feel that for that delivery they should have an advance of 25 cents a ton over current prices. It is doubtful, however, if consumers at the present time would be willing to make contracts for delivery after the first of the year at an advance over current prices. Foundries are buying only for their minimum requirements and for this reason are not expected to have much if any unconsumed tonnage under contract at the end of the year. Prices on foundry grades are firm at $13.50, Valley furnace, for No. 2. A local producer is adhering to a price of $13.50 for basic. For Cleveland delivery we quote as follows, delivered, for prompt shipment and the last quarter:

Bessemer	$15.90
Basic	$13.75 to 14.00
Northern foundry No. 2	13.75 to 14.00
Gray forge	13.25
Southern foundry No. 2	14.60 to 14.85
Jackson Co. silvery, 8 per cent. silicon	17.55

Coke.—The market is dull. There is no inquiry for furnace grades. Some foundry coke is being sold in small lots for prompt shipment. We quote standard Connellsville furnace coke at $1.50 to $1.55 per net ton, at oven, for prompt shipment, and $1.60 to $1.65 for the remainder of the year. Connellsville 72-hr. foundry coke is held at $1.85 to $1.95 for prompt shipment and $2 to $2.40 for contract.

Old Material.—The market is very dull and weaker. Prices on several grades have declined from 25c. to 50c. a ton during the week. A large amount of steel scrap is being offered by both dealers and producers, but the demand from consumers is very light. One local consumer is out of the market, and another is buying only at very attractive prices. Iron rolling mills are buying but little material, and there is practically no demand from the malleable and gray iron foundries. The embargoes at Canton and Monessen are still in force. The Wheeling & Lake Erie Railroad closed September 1 on a small list. Dealers' prices, per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails, rerolling	$12.75 to $13.00
Old iron rails	14.50 to 15.00
Steel car axles	17.50 to 18.00
Heavy melting steel	11.50 to 11.75
Old car wheels	12.00 to 12.25
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	10.75 to 11.25
Railroad malleable	12.25 to 12.50
Light bundled sheet scrap	9.50 to 10.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$19.00 to $19.50
Cast borings	6.50 to 6.75
Iron and steel turnings and drillings	7.00 to 7.25
Steel axle turnings	8.00 to 8.50
No. 1 busheling	9.50 to 10.00
No. 1 railroad wrought	11.75 to 12.00
No. 1 cast	11.25 to 11.75
Stove plate	9.50 to 10.00
Bundled tin scrap	11.00 to 11.50

Finished Iron and Steel.—The most important change in the condition of the local market is an improved demand for structural material. Inquiries are now pending for from 2000 to 3000 tons of structural steel in small lots for work under contract, and a fair volume of other structural work is in prospect. The general price situation is somewhat clearer and prices on some lines are firmer. While it appears that the 1.20c., Pittsburgh, price for steel bars has been shaded in a few cases, the market seems firm at the present time at 1.20c. for round lots. Some consumers have made attempts during the past few days to secure 1.15c. by offering to take a round tonnage, but have been unable to secure a concession from 1.20c. There is evidence that the price of structural material has been shaded $1 a ton, but the market now appears firm at 1.35c. The price of plates in this market has become quite generally established at 1.30c., Pittsburgh, but mills are still making sales in small lots at 1.35c. Prices on black and galvanized sheets have become fairly well established at $2 a ton below regular quotations. Mills are getting a fair volume of small orders for steel bars, plates and structural material, the aggregate of business placed being about the same as during the few previous

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weeks. The demand for hard steel bars for reinforcing work is quite good, being more actvie than earlier in the season. Hard steel bars are firm at 1.10c., Pittsburgh. Rivet prices continue weak. We quote structural rivets at 1.60c., Pittsburgh, and boiler rivets at 1.70c., but these prices are being shaded $1 a ton in some cases. The demand for iron bars is limited to small lots. Both local mills are running, but have few orders ahead. We quote iron bars at 1.25c. to 1.30c., at mill.

Birmingham

BIRMINGHAM, ALA., September 4, 1911.

Pig Iron.—The furnace interests are resting on their oars, so to speak, waiting patiently for the upward movement in prices which has been expected for the past 30 days. They all believe they are now on bottom so iar as prices are concerned, and any change must be for the better. The foundries seem content with the situation, ready to buy as far ahead as possible at $10 base for No. 2, but only taking their immediate requirements at the No. 2 basis of $10.50, this being the general price asked here now for nearby shipments. The furnaces seem to be relying on good crops and the delayed buying by the railroads to improve the market, while foundrymen regard the accumulated stocks on furnace yards as a guarantee of continued low prices. The position of these two interests promotes a deadlock which can only be affected by some general change in business conditions. A fair amount of inquiries for small tonnages for prompt shipment and liberal shipments against old contracts is in evidence. Prices are being generally held here at the following prices for nearby deliveries, all per gross ton f. o. b. furnace:

No. 1 soft	$11.00
No. 1 foundry	11.00
No. 2 soft	10.50
No. 2 foundry	10.50
No. 3 foundry	10.00
No. 4 foundry	9.75
Gray forge	9.50
Mottled	9.25

Cast Iron Pipe.—Texas and Oklahoma cities, together with Pacific coast points, seem to be the principal inquiries in this market for pipe, although there is the usual amount of buying for maintenance work coming from all sections. Stocks are not heavy on the yards, and shipments against old contracts are going forward in good volume, while none of the plants are running to full capacity. At the same time they report prospects of good business in the West this fall and their agents are active in that field now. Prices remain firm at the following schedule per net ton of 2000 lb., f. o. b. cars here: 4 to 6 in., $23; 8 to 12 in., $22; 12 in. and over, $21 average, with $1 per ton additional asked for gas pipe.

Old Material.—The dealers are taking advantage of all bargains offered, feeling that they can afford to buy at the present very low prices. The market is fairly active on some special grades, but the dealers do not expect to dispose of the bulk of their stocks until winter, when other districts are hampered by weather conditions, at which time they confidently expect to clean up their yards at a profit. Quotations are nominally as follows, per net ton, f. o. b. cars here:

Old iron axles (light)	$13.50 to $14.00
Old steel axles (light)	12.50 to 13.50
Old iron rails	12.50 to 13.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	9.50 to 10.00
No. 1 country wrought	7.50 to 8.00
No. 2 country wrought	7.00 to 7.50
No. 1 machinery	9.50 to 10.50
No. 1 steel	8.50 to 9.00
Tram car wheels	8.00 to 8.50
Standard car wheels	9.50 to 10.50
Light cast and stove plate	7.00 to 7.50

St. Louis

ST. LOUIS, MO., September 4, 1911.

September is starting out very quietly in the iron and steel business at this point, though reviews of August show that, although that month started out similarly, its aggregate was far ahead of July and in many cases ahead of August a year ago. Shipments have shown the same state of affairs as the new business booked. The situation here is regarded generally as of hand-to-mouth character for the present and immediate future, buyers taking only for immediate needs and insisting on prompt shipment.

Pig Iron.—Carload lot orders continue to be the rule in the pig iron market, but these are sufficient in the aggregate to make up a good business. Prices are well held, with no indication of softening. They are $10.50 to $11, Southern, Birmingham, for No. 2, and $13.50, Ironton, for No. 2 Northern, the latter figure being quoted for basic, malleable and foundry. There is no disposition here to open books for 1912 delivery at present quotations. No. 3 is growing scarcer and No. 4 seems to be still entirely out of the market.

Coke.—Sales are much of the same character as those of pig iron—small lots and quick shipment. The 5000-ton inquiry recently reported is still unplaced. An inquiry for 1300 tons is also in the market this week. Sales reported include one of 2000 tons of Virginia. The price range, all grades, is from $1.90 to $2.40 per net ton at oven, with best 72-hr. selected Connellsville or Stonega at $2 to $2.25, according to delivery period.

Finished Iron and Steel.—There has been a fair run of orders for structural steel, with marked insistence on immediate shipment. Little is being taken on forward requirements or for stock, and the fabricators are now taking only for immediate use. In bars the specifications have been fair, but the inquiries on new business have been rather light. In standard rails the only contract of moment was for 1700 tons from the East St. Louis, Columbia & Waterloo line for delivery over the remainder of this year. Another inquiry for about the same amount is in the market. In plates there has been practically no business. Track fastenings have been normal in movement. In light rails the inactivity of the coal mines has reduced the number of inquiries, while nothing is being heard from the lumber companies.

Old Materials.—The market for scrap has dropped back into a somnolent state after its recent flurry. While no falling off of consequence in the prices is reported, there has been no business, for buyers are almost completely out of the market. The 'Frisco list, which came out late last week, carried only 400 tons and that of the Missouri Pacific 700 tons. Dealers' prices, per gross ton, f.o.b. St. Louis, are as follows:

Old iron rails	$13.00 to $13.50
Old steel rails rerolling	13.00 to 13.50
Old steel rails, less than three ft	11.50 to 12.00
Relaying rails, standard section, subject to inspection	23.00 to 23.50
Old car wheels	13.00 to 13.50
Heavy melting steel scrap	11.50 to 12.00
Frogs, switches and guards cut apart	11.50 to 12.00

The following prices are per net ton:

Iron fish plates	$11.00 to $11.50
Iron car axles	19.50 to 20.00
Steel car axles	18.50 to 19.00
No. 1 railroad wrought	11.25 to 11.75
No. 2 railroad wrought	10.25 to 10.75
Railway springs	9.75 to 10.25
Locomotive tires, smooth	14.50 to 15.00
No. 1 dealers' forge	8.50 to 9.00
Mixed borings	6.50 to 7.00
No. 1 busheling	9.50 to 10.00
No. 1 boilers, cut to sheets and rings	8.00 to 8.50
No. 1 cast scrap	10.00 to 10.50
Stove plate and light cast scrap	8.00 to 8.50
Railroad malleable	8.50 to 9.00
Agricultural malleable	7.50 to 8.00
Pipes and flues	8.50 to 9.00
Railroad sheet and tank scrap	8.50 to 9.00
Railroad grate bars	8.00 to 8.50
Machine shop turnings	7.50 to 8.00

Preparatory to a general clean-up on the Gould lines in Texas, Judge T. J. Freeman, president of the International & Great Northern, and first vice-president of the Texas & Pacific, has just sold to the highest bidder, the National Iron & Steel Company, Houston, Texas, through its vice-president and general manager, I. H. Cohn, their entire accumulation of scrap iron, approximating some 500 cars. Most of this tonnage consists of rerolling rails, and a great part of it may move for export through Gulf ports.

Buffalo

BUFFALO, N. Y., September 5, 1911.

Pig Iron.—Orders booked the past week have not been large, as the majority of melters have covered the bulk of their requirements for the remainder of the year and furnaces are not yet inclined to quote for 1912 deliveries except in very special cases. There is still some good inquiry for 1911 delivery, one New Jersey company being in the market for 3000 tons, one-third each of three foundry grades. Orders received include one of 600 tons of No. 2 plain for last quarter delivery, taken at $13.50, and several ranging from 100 to 300 tons of foundry grades for the re-

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mainder of the year. One order of fairly good tonnage at current prices permitted of delivery of a portion distributed through January but required complete payment by January 1. The demand for shipment on contracts is pressing, and iron is going forward from furnaces in exceptionally heavy volume. Shipments of basic by lake to a South Chicago company on contract are also going forward at a good rate. Prices are stronger, $13.50 being the minimum for No. 2 X foundry for delivery over the remainder of the year, and most furnaces are asking $13.75 for small lots, while $14 is asked in some instances. For prompt and fourth quarter delivery we quote as follows f.o.b. Buffalo;

No. 1 X foundry	$13.75 to $14.25
No. 2 X foundry	13.50 to 14.00
No. 2 plain	13.50 to 13.75
No. 3 foundry	13.50
Gray forge	13.50
Malleable	13.75 to 14.25
Basic	13.75 to 14.25
Charcoal	16.50 to 17.50

Finished Iron and Steel.—Orders amounting to a fairly good tonnage have been placed in the week embracing most lines of finished products, and selling agencies for this district state that these orders were taken at prices generally maintaining quoted schedules. A number of small short period contracts for steel bars have been placed at ruling prices. Canadian business shows continued activity and prices are firm for quick delivery. There has been some cutting on cold-rolled steel in the export trade and large tonnages in steel bars for extended deliveries command slight concessions. A number of good-sized orders for structural shapes from Canadian sources are noted and specifications on contracts are liberal. In fabricated structural lines the demand continues active, and a good deal of small and miscellaneous work has been contracted for during the week. The Buffalo Structural Steel Company was low bidder for fabricating and erecting the 235 tons required for the Flint & Kent department store building, Buffalo, for which bids were opened to-day. The Lackawanna Bridge Company has recently taken contract for the 1000 tons required for the American Radiator Company's warehouse at Bayonne, N. J.

Old Material.—The demand for all kinds of scrap has fallen off decidedly and the market is extremely dull as compared with the past few weeks. The only material that is being moved is on old contracts. Prices are nominal and unchanged as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$13.00 to $13.50
Low phosphorus steel	16.00 to 16.50
No. 1 railroad wrought	14.00 to 14.50
No. 1 railroad and machinery cast scrap	13.75 to 14.25
Old steel axles	18.50 to 19.00
Old iron axles	22.00 to 22.50
Old car wheels	13.00 to 13.50
Railroad malleable	13.00 to 13.25
Boiler plate	12.50 to 13.00
Locomotive grate bars	11.00 to 11.50
Pipe	9.25 to 9.50
Wrought iron and soft steel turnings	7.25 to 7.50
Clean cast borings	7.00 to 7.25

San Francisco

SAN FRANCISCO, August 29, 1911.

The tonnage taken for this territory during the last month has in several departments been larger than for the month preceding, though the movement is still somewhat below the average of the last few years. Some increase of activity in the general trade is expected in September and October, but the anticipations of local merchants regarding the remainder of the year are moderate at best. The impending municipal election is assigned as a cause of dullness in this city, and the labor situation in the Harriman railroads is causing some anxiety all over the State. Merchants and manufacturers express a very conservative feeling regarding the outlook for the coming year. The improvement so far observed has consisted of increased small sales rather than large individual orders.

Bars.—The building trades continue to take a considerable tonnage of reinforcing bars, but most individual transactions in this line are small, the requirements of large development projects through the country being so far below expectations. Improvements connected with the Panama Exposition will doubtless cause an increased demand for reinforcement, but no business from this source can be expected before next spring. The jobbing trade in soft steel bars shows very slight improvement, while buying on the part of the larger manufacturing industries is limited to immediate needs. Merchants, also, are buying on a small scale. A large lot of foreign bars has just arrived in very bad condition. A rather firmer feeling is noted in the distributive trade, though resale prices in San Francisco are still quoted at 2c. for steel and 1.90c. for iron.

Structural Material.—No fabricating contracts of any importance have been signed in the past month, though two local jobs may be let at any time, and a few new plans are being figured. There is little of encouragement in the outlook for the next few months, local plans consisting mostly of small buildings requiring little steel. Only one large job is in prospect at Los Angeles, and there is practically nothing at Portland, Ore. The Ralston Iron Works has submitted the lowest bid on the new high school, but the figures are in excess of the appropriation and the job may have to be refigured. The Central Iron Works is low on the Knights of Columbus building and will probably get the contract, about 325 tons. No award has been made on the prospective jobs at Sacramento. Figures are being taken on the Mendel apartment building, which will require nearly 300 tons. It is estimated that the Standard Oil building will take about 1000 tons, but the plans may not be completed for some time. Plans for the new St. Luke's Hospital are about complete and may come up before long. The Pacific Rolling Mill has a small job for the Great Western Smelting Company, and a small steel shop building is to be erected for the American Forge Company. Plans are under way for a steel frame residence on Broadway near Webster street. The San Francisco Labor Council is planning to erect a building at a cost of about $200,000. Bids will be taken September 12 for steel work on the San Diego County jail.

Rails.—The recent tonnage has been materially increased by purchases on the part of the larger interests operating in California and the Pacific Northwest, while the movement of small lots is rather better than for some time past. Many inquiries are coming up to which little importance is attached, but the outlook for business from the smaller roads is improving. Considerable work is projected by the California Midland in the vicinity of Marysville, Cal., and there is some talk of a road from Big Meadows to the line of the Western Pacific. The San Diego, El Cajon & Escondido Railway Company has been organized at San Diego, Cal., for the purpose of building a 60-mile road.

Sheets.—Buying by merchants is less in evidence than a few weeks ago. The jobbing movement is increasing, but is below normal for this time of year, when considerable activity is the usual rule. A fair demand for corrugated sheets, however, is expected for the coming month. Resale prices on black, galvanized and blue annealed sheets continue easy.

Plates.—The movement of marine plates has been increased by the construction of a collier at the Mare Island navy yard, material for which is now arriving. Inquiry for tank plates is again increasing, though the current tonnage is not especially large. The Standard Oil Company is starting work on improvements to its Richmond plant, which will include three batteries of stills and increased boiler capacity. This company is preparing to erect distributing tanks at Riverside and Salinas, Cal. The Associated Oil Company is starting work on two large tanks in the Coalinga district.

Merchant Pipe.—Continued dullness is reported by most local merchants, and there is a rather easy feeling in prices in the distributive trade. Some of the jobbers, however, are buying a little more freely, and bookings by the local agents of manufacturers have increased materially. One agent reports bookings for August amounting to almost double the small tonnage taken in July, though no large orders have been received. Aside from sales to dealers, many small purchases have been made by water, gas and oil interests. There is no certainty of any further improvement, though more jobbing business is expected next month, and merchants are now carrying rather light supplies. The city of Los Angeles has taken figures on about 65,000 ft. of ¼ to 1-in. pipe, and the city of Aberdeen, Wash., will receive bids August 30 for about 45,000 ft. of ¾ to 2-in. pipe. The Sacramento Pipe Works has taken an order for 45,000 ft. of 4 to 12-in. pipe for the town of Oakdale, Cal.

Cast Iron Pipe.—The coast market is a little more

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active than at the beginning of the month, with indications of further improvement. The most important orders are still coming from southern California, though a number of small transactions have been closed in this part of the State. The Coronado Water Company and the city of San Diego have placed fair orders with the United States Pipe Company, and the city of Los Angeles has divided an order for 955 tons among several interests. The town of Porterville, Cal., will open bids on a lot of pipe September 4, and the city of Santa Cruz, Cal., has just received figures on a small lot of 4-in. pipe. The city of Portland, Ore., will open bids September 1 on 735 gate valves, of 6, 8, 12 and 16-in. diameter.

Pig Iron.—Local requirements are of a limited nature and orders from the foundry trade are coming out slowly, though a little more movement is reported in other parts of the coast. No. 2 Southern foundry iron is valued at about $20.50, but is little more than nominal. Foreign foundry iron is quotable at the former wide range, $20 to $24, the actual price varying considerably according to terms of sale, etc.

Old Material.—A limited movement of old rails and melting scrap is under way, but supplies of the latter continue to accumulate in the yards, and further shipments to the East coast are likely. Requirements of melting scrap on this coast of late have been considerably below expectations. Cast scrap is also moving rather slowly, and wrought iron scrap is extremely dull. Prices are as follows: Cast iron scrap, per net ton, $16; steel melting scrap, per gross ton, $10.50 to $11; wrought scrap, per net ton, $11 to $15; rerolling rails, per net ton, $11.

Boston

BOSTON, MASS., September 6, 1911.

Old Material.—The market for scrap is dull. Dealers had entertained the hope that the closing weeks of summer would see a marked improvement, but have been disappointed. More material has come out in the past month than in the three preceding months, and metal is still being offered freely by producers. Boston does a large export business with Montreal, St. John and other Canadian ports, and this trade is moderately good. Prices to the mills are made attractive in some cases, especially by the smaller dealers, whose opinion seems to be that no marked improvement is in sight. Dealers' prices, carload lots, f.o.b. Boston and other New England points taking Boston rates (comprising practically all the important centers in their relations with eastern Pennsylvania), are as follows:

Heavy melting steel	$10.00 to $10.50
Low phosphorus steel	13.75 to 14.25
Old steel axles	16.50 to 17.00
Old iron axles	20.00 to 21.00
Mixed shafting	12.75 to 13.25
No. 1 wrought and soft steel	11.00 to 11.25
Wrought iron pipe	9.25 to 9.50
Skeleton (bundled)	7.75 to 8.00
Cotton ties	8.00 to 8.25
No. 2 light	4.50 to 5.00
Wrought turnings	5.75 to 6.00
Cast borings	5.00 to 5.50
Machinery cast	12.50 to 13.00
Malleable	11.00 to 11.50
Grate bars	6.00 to 6.50
Stove plate	8.50 to 9.00

The German Iron Market

BERLIN, August 25, 1911.—A moderate increase of activity appears to be the characteristic feature of the iron trade the past fortnight. At the fortnightly trading on the Düsseldorf Exchange a week ago the situation was summarized as follows: "Calls for delivery of goods are brisk in all lines." On the same day the quotations for most grades of Siegerland pig iron, as well as some of the Luxemburg-Lorraine qualities, were advanced about one mark per ton. In other directions prices are apparently firmly held. In bar steel for home delivery prices are quoted at 100 to 102 marks by all the leading mills; export prices range between 94 and 96 marks, f.o.b. In nearly all products the mills are well supplied with orders, and in some kinds work is carried on under pressure. The foreign market continues to show an active demand for rails, beams, heavy plates, bars and semi-manufactured material.

The Steel Works Union will fix the prices next week for the last quarter of the year. It is already regarded as practically certain that the reduction in steel material, applied for last month by mills running exclusively upon finished products, will not be voted; neither is any change in structural shapes looked for. The union continues in a position of giving the mills larger orders for half-rolled material than their allotments call for, and the demand for structural forms also continues brisk. The export demand for rails has lost nothing of its previous activity, but the home railroad authorities are still disappointing the expectations of producers.

In heavy plates business continues very brisk, and not a few of the mills are running to their utmost capacity. German shipyards continue to receive orders for steamers, and they are calling for unusually large quantities of plates. English yards are also taking large quantities of German plates. In thin plates the amount of work in hand has increased this month. Mills running on wire rods are well employed, but the position of the wire-nail mills is not satisfactory. This is especially the case with mills that do not produce their own material; and mills of this class are quite unable to fill export orders at existing prices without losing money. Tube mills have plenty of work to do, but the sharp competition that has prevailed since the organization broke down some months ago continues unabated, and there is no prospect that a change at this point will occur soon. An attempt is being made to induce those producers of bar steel who are members of the union to agree to take no orders for delivery beyond March 31, 1912. It is hoped, in the forthcoming renewal of the union, to include bars in the list of fully syndicated goods. The prospect for doing this, however, is not at all encouraging, after the former price convention broke down in March.

The pig-iron trade is quiet. Little business is doing in view of the fact that sales for 1912 delivery have not yet been declared open, and the supplementary amounts required for the current year are not large. The arrangement between the Luxemburg-Lorraine furnaces and the Essen Syndicate has not yet been perfected, but the prospects for a favorable result are said to have improved to a marked degree. The meeting at which an agreement was expected to be signed, however, was postponed till next week, when it is believed that the furnaces in question will either join the syndicate outright or will enter into contract relations with it for maintaining prices and controlling production. An advance of 2 or 3 marks per ton on the grades of iron produced in the Rhenish-Westphalian region is looked for upon the completion of the syndicate's organization; Siegerland grades have already been advanced. The interesting question as to whether the syndicate will decide to keep production at its present level will have to be determined at an early day, probably next week. Meanwhile the preparations of the big companies to increase still further their means of production are proceeding without abatement. It is now announced that the Gelsenkirchen Company, which, as previously reported in this correspondence, is building a great steel and iron plant at Esch in the southern part of Luxemburg, will blow in two of its new furnaces there in October, and four more will be completed by the end of the year. The steel mills are expected to begin operations in April.

Germany's exports of iron and steel in July reached 539,411 tons, being the greatest amount in the history of the trade. The excess of exports over imports gained 126,000 tons over July, 1910.

New York

NEW YORK, September 6, 1911.

Pig Iron.—The volume of business is still limited by two conditions, namely, that no great amount of iron will need to be bought to carry the foundries through the year and that furnacemen have no inducements to offer to start buying for next year. The very considerable amount of idle blast furnace capacity, some of which is only waiting for the first signs of improvement to blow in, encourages buyers to hold off, awaiting the outcome of the effort to establish for deliveries next year some advance on the current price. Some inquiry for malleable pig iron has come from New England and one Connecticut melter is in the market for 2500 tons of foundry iron, the major part for October and November delivery. Some Southern iron will probably be included in this purchase. Some buying is reported by New York State foundries, the transactions including irons for malleable and stove plate work. One sale of 4000 tons was made in New York State and another of

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several thousand tons. In a few cases deliveries on current business stretch over into 1912. Foundries in this district are melting iron at about the same rate as in the past three months and are taking their iron at the contract rate of shipment in most cases. Meantime there has been a further slight reduction in stocks of iron at furnaces. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $15.50 to $15.75; No. 2 X, $15 to $15.25; No. 2 plain, $14.75 to $15. Southern iron is quoted at $15.25 to $15.50 for No. 1 foundry and at $14.75 to $15 for No. 2.

Finished Iron and Steel.—A continued absence of new inquiry and inability of the trade to gauge the promise of the immediate future, unless it is a lack of promise, describes present conditions. Uncertainty in prices is more pronounced than last week and it applies to plates as well as to steel bars and fabricated material. Bar iron seems still to maintain the strength it developed a few weeks ago, and is moving in fairly good volume. In steel bars, which are quite dull, the Pittsburgh base of 1.20c. is admitted, but some mills assert they are holding at 1.25c., Pittsburgh. In structural material a 1500-ton 12-story building, for the Seaman's Church Institute, Coenties slip, Jno. Downey, general contractor, is being figured; bids were due on September 6 for the viaduct work of the New York Central terminal area, 1000 tons; bids were due the same day for three bridges involving about 450 tons for the Boston & Maine, and bids are wanted by September 12 for two small bridges for the New Haven road. A 200-ton school building is to be erected at Hackensack, N. J., John T. Brady & Co., builders. Original plans for the Filene building, Boston, have been called in, and the action is taken to indicate a revision of design. A similar course has been taken with the 1700-ton garage for the Locomobile Company. The award for 14,000-ton structure for the Kansas City terminal is still pending at this writing. The Eastern Steel Company is low bidder for 300 tons of bridge work for the Pennsylvania Railroad. The Alfred E. Norton Company has a 600-ton contract for a mercantile building for Mrs. L. C. H. Dyckman, Edward Corning Company, builder. Quotations are: Plain structural materials and plates, 1.51c. to 1.56c.; steel bars, 1.36c. to 1.41c.; bar iron, 1.30c. to 1.35c., all New York. Plain material and plates from store, New York, 1.80c. to 1.90c.

Cast Iron Pipe.—The Department of Water Supply, Gas and Electricity of the city of New York will open bids September 13 from contractors for furnishing and laying 570 tons of 12-in. pipe and fittings. This appears to be the only letting of any importance at present in sight in this section. Several large private purchases have either recently been closed or are now rapidly approaching the closing point. Quite a considerable tonnage is involved in these transactions. Manufacturers of pipe feel considerably encouraged with the recent increase in business and with the indications of more interest shown by consumers. While prices have not materially changed, some important companies are asking more money for certain sizes on which their books are well filled for the next few weeks. Carload lots of 6-in. may still be quoted at $21 to $22 per net ton, tidewater.

Old Material.—Some movement has occurred in heavy melting steel scrap, but it has consisted mainly of purchases by dealers to apply against contracts. The eastern Pennsylvania consumers are either well covered or are not disposed to purchase except at lower than recently prevailing prices. Some important steel companies are only offering $12.50 delivered for the remainder of the year. Cast scrap has been in some demand, but only in small lots. Borings and turnings are neglected. Rolling mills are doing comparatively nothing in the market. Quotations are as follows, per gross ton, New York and vicinity:

Old girder and T-rails for melting	$10.25 to $10.50
Heavy melting steel scrap	10.25 to 10.50
Relaying rails	20.50 to 21.50
Rerolling rails (nominal)	12.00 to 12.50
Standard hammered iron car axles	21.50 to 22.00
Old steel car axles	16.00 to 16.50
No. 1 railroad wrought	12.50 to 13.00
Wrought iron track scrap	11.00 to 11.50
No. 1 yard wrought, long	11.00 to 11.50
No. 1 yard wrought, short	10.00 to 10.50
Light iron	4.25 to 4.75
Cast borings	6.00 to 6.50
Wrought turnings	6.50 to 7.00
Wrought pipe	10.00 to 10.50
Old car wheels	10.50 to 11.00
No. 1 heavy cast, broken up	10.50 to 11.00
Stove plate	8.50 to 9.00
Locomotive grate bars	8.50 to 9.00
Malleable cast	10.50 to 11.00

Ferroalloys.—A Central Western purchaser has closed for a large quantity of ferromanganese at around $37, Baltimore. The inquiry was for 5000 tons, but the consumer did not purchase that amount. The market in ferrosilicon is very quiet, and it can be bought at $57, Pittsburgh.

Metal Market

NEW YORK, September 6, 1911.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead.		Spelter.	
Aug.	Lake.	Electrolytic.	Tin. New York.	New York.	St. Louis.	New York.	St. Louis.
31	12.75	12.50	42.25	4.50	4.42½	6.05	5.90
Sept. 1	12.75	12.50	42.20	4.50	4.42½	6.00	5.80
2	12.75	12.50	....	4.50	4.42½	6.00	5.80
5	12.75	12.50	41.25	4.50	4.42½	6.00	5.80
6	12.75	12.50	41.25	4.50	4.42½	6.00	5.80

The premiums on spot tin have been discontinued and the market is getting back to normal conditions. Copper is unchanged and very dull. Spelter has declined five points. Lead is very quiet.

Copper.—A few good sales of electrolytic copper are reported at 12.50c. for spot delivery in New York. Some dealers refuse to accept that price, holding out for 12.55c. and 12.60c. The impression is abroad among the dealers that many important consumers are very short of stock and the market shows signs of advancing. Exports of copper have been quite heavy so far this month, amounting in all to 4149 tons. The London market was reported steady this morning with spot copper offered at £56 and futures at £56 13s. 9d.

Copper Averages.—The Waterbury average for August was 12.75c. The average price of Lake copper in New York was 12.75c. and the average price of electrolytic was 12.57½c.

Pig Tin.—The pig tin market is slowly getting back to a normal basis, and premiums have been practically abolished. There have been some good arrivals of pig tin, and the steamer Minnehaha is expected in within a few days with 1000 tons, so that supplies are fairly plentiful. Some heavy trading was done in this market during the week, and there was considerable excitement yesterday when it was found that the London market had gone off £4 during the holiday of Monday. This resulted in lower prices here, with something of a scramble to buy. Pig tin to-day was offered at 41.25.

Tin Plates.—A better volume of inquiries is coming out and there are signs that the can manufacturers will shortly make good purchases. The price is unchanged at $3.94 for 100-lb. coke plates. Foreign tin plates are quoted at 13s. 9d. at Swansea, Wales.

Lead.—Lead is very quiet and uninteresting. The American Smelting & Refining Company continues to maintain the New York price at 4.50c. The St. Louis market is reported quiet and lead to-day was bringing 4.42½c. in that market.

Spelter.—Spelter prices dropped five points during the week, and while the metal is being subjected to considerable manipulation on the part of dealers, consumers decline to show any great amount of interest in it. This morning the New York price was 6c. and the price in St. Louis was 5.80c. The Waterbury average for spelter for August was 6.29c.

Antimony.—The London dock strike prevented some shipments of antimony to this country, but stocks were so plentiful that the market was not affected upward, continuing very weak. Hallett's is offered at 7.75c., Cookson's around 8.37½c. and Chinese and Hungarian brands are being offered at about 7.37½c.

Old Metals.—The market is weak, but dealers' selling prices, New York, are nominally unchanged, as follows:

Copper, heavy cut and crucible	$12.00 to $12.25
Copper, heavy and wire	11.50 to 11.75
Copper, light and bottoms	10.75 to 11.00
Brass, heavy	8.00 to 8.25
Brass, light	6.75 to 7.00
Heavy machine composition	10.50 to 10.75
Composition turnings	8.75 to 9.00
Clean brass turnings	8.00 to 8.25
Lead, heavy	4.20 to 4.25
Lead, tea	3.95 to 4.00
Zinc, scrap	4.25 to 4.30

Chicago

SEPTEMBER 5.—Trading in metals during the past week was very dull. With the exception of slight fluctuations in the price of tin the market quotations have

remained unchanged for Chicago delivery as follows: Casting copper, 12.65c.; Lake, 12⅞c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 44c.; small lots, 46c.; lead, desilverized, 4.45c. to 4.50c. for 50-ton lots; corroding, 4.72½c. to 4.75c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.90c. to 5.95c.; Cookson's antimony, 9¼c., and other grades, 8¼c. to 8¾c., in small lots; sheet zinc is $8 f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 10¾c.; copper bottoms, 9½c.; copper clips, 10¼c.; red brass, 9½c.; yellow brass, 7½c.; lead pipe, 4c.; zinc, 5c.; pewter, No. 1, 26c.; tinfoil, 33c.; block tin pipe, 37c.

St. Louis

SEPTEMBER 4.—The metal market is rather quiet, with little to affect prices. Tin stands at 42.85c.; Lake copper, 13.05c.; electrolytic copper, 12.90c.; Cookson's antimony, 8.72½c.; lead, nominal, at 4.37½c., and spelter, also nominal, at 5.80c. In the Joplin district the past week 60 per cent. blende brought $48 for the top price. The surplus blende is now down to about 3000 tons for the district, but is expected to increase, as the mines are nearly all reopened, having been pumped out. Calamine is bringing $32 per ton for the best lots, though the basis price on 40 per cent. metallic contents is $23 to $25. Lead ore is bringing $60 to $63 per ton and the bins are all cleaned out. The prices of old metals are as follows: Light brass, 4c.; heavy brass and light copper, 8c.; heavy copper and copper wire, 9c.; zinc, 3c.; lead, 3¼c.; pewter, 20c.; tinfoil, 29c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, September 6, 1911.

The stock exchanges were closed on Saturday and Monday, and therefore the current review applies to only four days of activity. Marked fluctuations occurred in this time, however, some days displaying considerable strength while others showed decided weakness. The general feeling prevails that the liquidation so strongly in evidence for two or three weeks has about run its course and that until some unfavorable conditions develop the market can be expected to maintain about present values. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., pref...	17½- 18	Pressed Steel, com..	30 - 30⅛
Beth Steel, com....	28¾- 30	Pressed Steel, pref.....	100
Beth. Steel, pref....	59⅞- 60⅞	Railway Spring, com.	30 - 30¼
Can, com.....	9⅝- 10⅜	Republic, com.....	24⅞- 26
Can, pref.....	82¼- 85¾	Republic, pref.....	88⅜
Car & Fdry., com...	48 - 49	Sloss, com.....	37
Car & Fdry., pref.....	115	Pipe, com.....	13
Steel Foundries.....	31 - 32½	Pipe, pref.....	45 - 46
Colorado Fuel.....	27⅞- 28	U. S. Steel, com...	69¾-71¼*
General Electric....	150¼-153	U. S. Steel, pref...	114¼-115¾
Gr. N. Ore Cert...	47½- 49	Westg. Elec.....	64 - 65½
Int. Harvester, com.	103¾-107½	Am. Ship, com.....	56 - 57½
Int. Harvester, pref.	119½-121	Chic. Pneu. Tool....	46 - 46½
Int. Pump, com....	32½- 33	Cambria Steel.....	44 - 44¼
Locomotive, com....	34⅛- 35⅝	Lake Sup. Corp....	22⅞- 23
Locomotive, pref....	104⅛-105¾	Crucible Steel, com..	11⅛- 11⅝
Nat. En. & St., pref.....	95	Crucible Steel, pref.	80 - 80½

* Ex. dividend.

Dividends Declared

The Pittsburgh Valve, Foundry & Construction Company, regular quarterly, 1½ per cent., on the preferred stock.

The American Car & Foundry Company, regular quarterly, 1¾ per cent., on the preferred stock and ½ of 1 per cent. on the common, payable October 2.

Trade Publications

Induction Motors and Buffing Lathes.—Emerson Electric Mfg. Company, St. Louis, Mo. Three bulletins. The first two, Nos. 3142 and 3143, replacing Nos. 3139 and 3140 respectively, deal with single-phase induction motors of the full load start clutch types. The first bulletin describes and illustrates a back geared motor with countershaft which is made in ⅓ and ½-hp. sizes, while the other treats of a complete line varying from 1/20 to ½ hp. No. 3709, replacing No. 3707, illustrates an electric buffing lathe for use on both alternating and direct current circuits. These machines will operate on alternating current of from 25 to 133 cycles or on direct current at a potential of 110 and 220 volts.

Emery Wheels.—Pittsburgh Emery Wheel Company, Park Building, Pittsburgh, Pa., works Rochester, Pa. Illustrated catalogue. Describes the company's line of emery wheels and swing-frame grinding machines. Illustrations are given of emery, carborundum and adamite wheels, of emery wheels mounted on spindles with safety collars applied, and of swing-frame grinding machines, which are a specialty of this company. Tables are presented of grinding wheel speeds and price lists are given on straight and safety shape wheels, cup wheels and grinding machines.

Refuse Destructor.—The Griscom-Spencer Company, 90 West street, New York, N. Y. Bulletin No. 701. Pertains to the Morse destructor furnace which is built in many sizes and various constructions to meet the demand for the combustion of every class of refuse matter. These destructors possess the special advantages of convenient charging of material, introduction and regulation of air supply, maintenance of a uniform temperature and the removal of the residue.

Recording Instruments.—The Bristol Company, Waterbury, Conn. Bulletin and catalogue. The first, No. 142, shows a line of recording water level gauges for automatically recording the depth of water and other liquids, the rate of flow of water over weirs and the volumes of liquids in tanks. Condensed catalogue No. 160 is a general catalogue of recording instruments for pressure, temperature, electricity, speed, time, etc. Some of the instruments covered in the latter are the Bristol-Durand radii averaging instrument and the Bristol class III. compensated recording thermometer which were illustrated in *The Iron Age*, June 30, 1910, and January 19, 1911, respectively.

Insulated Wires and Cables.—Hazard Mfg. Company, Wilkes-Barre, Pa. Pamphlet. Size, 3½ x 6 in.; pages, 44. Describes and illustrates the various types of bar, and insulated copper wire and cables which this company is prepared to furnish. These include bare copper wire, copper cable for lightning rods, annunciator and magnet wire, rubber covered wires and cables, telephone and telegraph wires and cables and a number of special cords and cables. One of the installations where this company's railroad signal wires and cables were used was at the new Washington Union Station and a half tone engraving gives some idea of the magnitude of this work. A list of branch offices and agencies handling the company's wire rope and insulated wires and a list of the various Hazard products complete the pamphlet.

Feed Water Heater.—Benjamin F. Kelley & Son, 25 Church street, New York, N. Y. Booklet, entitled "The Utilization of Waste Steam." Describes the Standard water-tube feed water heater with numerous half tones and line engravings. Mention is made of the Kelley grease extractor and oil separator and a description of it together with a table of dimensions completes the booklet.

Flexible Casing.—T. R. Almond Mfg. Company, Ashburnham, Mass. Booklet. Describes a flexible casing for speedometer shafts which is claimed to be jar, strain and rust-proof and will not set under any condition. A high degree of flexibility has been secured in manufacturing this casing, so that it cannot be forced into any shape that will restrict the operation of the shaft or form a short kink. This casing consists of two coiled wires, one firmly and snugly encased within the other. The inner wire is a tempered steel spring, which forms a small bore tube that supports the flexable shaft, while the outer coil, which makes the casing oil-tight is a solid brass wire of special design.

Face Protector.—F. S. Lozuaway, 4206 Seventy-sixth street, S. E., Portland, Ore. Circular. Concerned with the champion face protector, which is a device for protecting the eyes and face when working in shops, chipping rooms, open hearths, sand blast and intense heat, automobile driving and wherever injury from dust or flying objects might occur. The protector consists of a frame suspended in front of the face and carrying a number of removable plates through which the wearer can see.

Tanks.—New York Central Iron Works Company, Geneva, N. Y. Catalogue and price list No. 55. Covers the Dunning line of tanks, which are made for hot-water storage, for air and gasoline and for pneumatic water systems. All of these different types are illustrated and described, and there are a number of tables giving the different sizes, capacities and weights. Space is also devoted to accessories such as manholes, saddles, hangers, nozzles, stuffing boxes and heads. Tables giving the capacity in U. S. gallons for round and rectangular tanks of various sizes for 1 ft. depth complete the catalogue.

Blast Furnace Views.—William B. Pollock Company, Youngstown, Ohio. Supplement No. 22 of the company's general book of views of modern blast furnaces which it has built. Pages 2 to 8 show No. 4 and pages 9 to 12 Nos. 2 and 3 Haselton furnaces of the Republic Iron & Steel Company, Haselton, Ohio.

The Panama Scrap Sale.—At Washington, D. C., September 5, proposals were opened from 11 bidders for the scrap metal relics of the machinery used by the French in their attempt to dig a canal across the Isthmus, and which the United States Government wishes to clear away before the waterway is completed. The highest bids came from the Chicago House Wrecking Company, ranging from $215,000 to $700,000, and the Phoenix Iron & Steel Company, Galveston, Texas, $66,250 to $246,250. The scrap scattered along the canal line consists of locomotives, dump cars, tanks, barges, and miscellaneous junk, weighing from 45,000 to 120,000 tons. The successful bidder must remove it within three years.

Personal

W. H. Oliver, Jr., purchasing agent of the Phillips Sheet & Tin Plate Company, Weirton, W. Va., has resigned and is now organizing a supply company, to be located in the city of Pittsburgh, to deal in mill, mine, factory, glass house, paper mill, brick yard, etc., supplies.

H. H. Duley has resigned his position of chief sprinkler inspector of the Cincinnati Fire Prevention Bureau, Cincinnati, Ohio, to become president of the new Cincinnati Fire Extinguisher Company.

R. G. McClure, secretary of the Indianapolis Commercial Association, has been selected as manager of the Cincinnati Commercial Association, vice J. M. Manley, who declined to accept the position. Carl P. Dehoney, formerly acting secretary of the association, has been elected secretary to assist Mr. McClure in his duties.

J. A. Campbell, president, and W. E. Manning, assistant manager of sales, of the Youngstown Sheet & Tube Company, Youngstown, Ohio, returned from Europe last week.

The election of Peter J. McArdle as one of the nine Councilmen in Pittsburgh will probably mean his retirement as president of the Amalgamated Association, a position he has held for several years.

C. H. Booth, of Youngstown, Ohio, vice-president of the United Engineering & Foundry Company, Pittsburgh, has returned from a trip to Europe.

Henry L. Barton, vice-president of the Metals Product Company, Detroit, Mich., has accepted a position with the General Motors Company of the same city.

Andrew C. Campbell has severed his connection with the E. J. Manville Machine Company, Waterville, Conn., with which company he was identified for the past 16 years, in the capacities of chief engineer, mechanical executive, secretary and superintendent. He is at present maintaining an office in Waterbury, as consulting engineer.

George T. Frankenburg has been appointed superintendent of the Columbus Brass Company, Columbus, Ohio. He was formerly outside foreman of the Cambria Steel Company, Johnstown, Pa.

Leo Loeb has recently been made assistant steam engineer in the steam engineering department of the Cambria Steel Company, Johnstown, Pa. He was formerly assistant professor of mechanical engineering at the Renssalaer Polytechnic Institute, Troy, N. Y.

Everett S. Swartwout has been appointed manager of the Chicago office of the Nordberg Mfg. Company, Milwaukee, Wis.

Lewis Wehner has severed his connection with the Bucyrus Company, South Milwaukee, Wis., to become chief engineer of the Vulcan Steam Shovel Company, Toledo, Ohio.

President James A. Farrell, of the United States Steel Corporation, is in Chicago this week and will visit the Gary and South Chicago works. From Chicago he and other officers of the corporation and subsidiaries go to Duluth, where a meeting of presidents of the subsidiary companies will be held Friday and Saturday.

Dr. F. Schniewind, of the United Coke & Gas Company, New York, is in Europe.

George G. Blackwell, Sons & Co., Ltd., Liverpool, England, state that they are and have been for some considerable time engaged on practical experiments to determine the relative value and effects to be obtained in the manufacture of various grades of steel by the introduction of the rarer metals such as molybdenum, vanadium, titanium, chromium, tungsten, etc. They state that the outcome of their experiments is as highly satisfactory as they are astonishing, and results of the greatest utility to the steel manufacturer have been amply demonstrated. They are not yet in position to make an announcement for publication, but are willing to correspond with any one interested in the subject of the various ferroalloys which are now coming so much to the front in the manufacture of high grade steel.

Obituary

DANIEL E. GARRISON, JR., of St. Louis, Mo. died September 2 at the Waldorf-Astoria, New York, from a self-inflicted wound. He was 44 years old and had been suffering from despondency over his health. He was vice-president of the Corrugated Bar Company, of which his father, Daniel E. Garrison, Sr., is president. The Garrison family has long been prominent in manufacturing and general business undertakings in St. Louis and the Southwest. The deceased was a widower and leaves a son.

S. O. GREENING, head of the B. Greening Wire Company, Hamilton, Ont., Canada, died last week, aged 64 years. He succeeded to the chief direction of the company on the death of his father in 1877. He was born in Manchester, England, and went to Hamilton with his father in 1856.

FRANK R. LONG, president and manager of the Frank R. Long Construction Company, Hackensack, N. J., died at his home in that town August 30 from stomach trouble.

Standard Boiler Rules

Standard rules for the care and construction of boilers are to be made the subject of a study by a special committee appointed by the Executive Committee of the American Society of Mechanical Engineers. The personnel of the committee is as follows: John A. Stevens, consulting engineer, Lowell, Mass., chairman; Edward F. Miller, professor of steam engineering, Massachusetts Institute of Technology, Boston, Mass.; Charles L. Huston, vice-president, Lukens Iron & Steel Company, Coatesville, Pa.; Herman C. Meinholtz, vice-president and superintendent, Heine Safety Boiler Company, St. Louis, Mo.; R. C. Carpenter, professor of experimental engineering, Sibley College, Cornell University, Ithaca, N. Y.; William H. Boehm, superintendent of steam boiler and flywheel insurance departments, Fidelity & Casualty Company, New York, N.Y., and Richard Hammond, president, Lake Erie Engineering Works, Buffalo, N.Y. There is reason to believe that a set of carefully prepared specifications formulated and recommended by such a committee will be recognized as a standard by legislatures and officials and that uniformity in legal provisions will be obtained.

Conservation Congress

The Third National Conservation Congress will be held in Kansas City, Mo., September 25, 26 and 27. Special attention is to be given to the maintenance and improvement of the fertility of the soil and also to the "influence of farm and rural life in promoting that strength and independence of character required for the highest class of citizenship." The delegates include 15 appointed by the Governor of each State; five appointed by the mayor of each city with a population of 25,000 or more; three delegates from smaller cities; three delegates appointed by county commissioners; five delegates from each national organization concerned in the work of conservation; three delegates from each chamber of commerce or similar organization concerned in the work of conservation; two delegates each to represent universities and experiment stations, and others. Henry Wallace, Des Moines, Ia., is president of the congress, and the executive secretary to whom names of delegates should be sent is Thomas R. Shipp, Washington, D. C., whose convention address is, National Conservation Congress, Kansas City, Mo.

The Pioneer furnaces of the Republic Iron & Steel Company made a new record in August with an output of 24,663 gross tons for the three stacks. The No. 3 furnace produced 9248 tons, or 298 tons a day against 8987 tons as its best previous month's output. The Republic Company's new No. 4 Haselton furnace made an output of 13,752 tons, or an average of 438 tons a day. Its largest single day's output was 501 tons.

The Princess Furnace Company, Glen Wilton, Va., blew out its furnace early last week. It will be idle until conditions in the iron market show an improvement.

Nelson Valve Company's Annual Dinner

The annual dinner of the Nelson Valve Company, Philadelphia, Pa. tendered to its officers and heads of departments, together with a few invited guests, was held at Nelson Hall, on the company's property, Tuesday evening, September 5.

Gathered around the banquet table were the members of the complete organization, including the sales representatives from all parts of the world. The occasion was memorable in that it was held upon the twentieth anniversary of the company.

Carlisle Mason, vice-president and general manager, presided as toastmaster and at his right sat Major George Mason, his father, one of the pioneers of the steel business in this country, and under whose direction what is stated to be the first boiler made of steel west of the Allegheny mountains was constructed at the plant of the Union Boiler Works at Chicago. His talk was reminiscent, and in conclusion he said it was one of the proudest moments of his life to be at the dinner and see his son the head of an institution such as the Nelson Valve Company.

General Manager Mason in talking to his guests said that the success of this company had been phenomenal; that each year it had doubled in size; that each month for the past two years had been greater than the one preceding, and that this had been accomplished by bearing in mind and practising honesty, fair-mindedness and good business policy with its customers, and giving in value a dollar's worth for every dollar.

Other speakers at the dinner were: George R. Van Dusen, corporation counsel; James Morton, representative in India, Australia, Strait Settlements, China, Japan and the Philippine Islands; Stockton Bates, auditor; Russell Bonnell, secretary; T. K. P. Haines, purchasing agent and advertising manager; Thomas Oakes, New York representative; W. J. Spencer, sales manager, and C. C. Peck, superintendent.

The trend of the remarks was toward continued cooperation, improvement in output and the upbuilding of the company, maintenance of quality, right principles and push.

The souvenirs of the dinner were replicas of the Franklin Institute medal given the company for excellence of output at the National Export Exposition, and on the reverse side the N-flying-V trademark of the company on its steel castings. Another souvenir was a cigar case.

Tags for Factory Operating Systems

Most business men, when tags are mentioned, think of the ordinary patched and eyeleted piece of stock that is used on bundles and packages. With the perfection of factory systems and the growth of the economical idea of a greater division of labor, manifold other uses are constantly being found for the tag. Special machines have been constructed for making, printing, couponing and numbering tags of extraordinary lengths and widths.

The reasons for the adoption by the superintendent or manager of a tag rather than a card in a factory system are two: 1. The hole of the tag, surrounded by a tough paper patch and reinforced with a metal eyelet if necessary, is convenient for hanging the tag on a machine or nail, or for tying it to a part going through the plant. The fact that the hole is there encourages the workman to hang the tag up instead of letting it lie on the work bench, where it is more apt to be mislaid, damaged or destroyed. 2. The tough, well-calendered stock of which the better grades of tags are manufactured makes the work easier for the office help who write out the tags and for the shop men who read and follow the directions upon them. A clean, smooth stock takes pencil, ink or carbon impression equally well, and time is saved both in the writing and the reading of the tag. As a natural consequence mistakes are less likely to happen when the tags are made out clearly.

Probably the most widely used and best known of system tags is the pay coupon tag which is adapted to factories and shops where the piece work system is in operation. This tag, in a high state of development, is seen in shoe factories where the division of labor is very great. It is also used by manufacturers of metal and electrical appliances, automobiles and carriages, mattresses, brass beds and furniture. On each tag are as many coupons as there are operations in manufacture. Each coupon is numbered and the workman, on completing his portion of the job, reports to the inspector or foreman, who O.K.'s the coupon and returns it to the operative. At the end of the week the coupons are returned to the office, checked off, and the pay slips made out. After payment has been made the coupons are canceled, kept about a month and then destroyed. Various methods of cancellation are in use. One suggested by the Dennison Mfg. Company is to dip one end of the coupon into a pot of yellow ochre dye. The coupons in this way can be canceled in bunches of 100 or more in one operation.

Shop order tags are regarded as a second grade division. These are issued by the office and contain instructions to the operative, who usually is paid by time and not by the piece. On account of durability and smooth surfaced stock they are intended to replace ordinary order-cards or slips. In some factories order tags contain numbered coupons, each one of which is a call for material to be delivered to the assembling department. When using such a tag the stub or upper end goes direct to the assembling room and carries upon its face the necessary directions. Each order coupon goes to the proper shop or store room and the parts called for are sent with it to the assembling room. Here the parts are grouped according to the numbers on the coupons and the articles are put together.

There is commonly a need of different kinds of record or special order tags which may be roughly grouped as follows. Stock bin tags, supply tags, "hold" tags, "hurry" tags, defective material tags, "rejected" tags, and machine record tags of various sorts. It is often found convenient when necessary to distinguish between operatives or periods of time to adopt tags of different colors. System tags are mentioned and illustrated in books written by specialists in factory organization and administration, including "Factory Organization and Administration," by Prof. Hugo Diemer; "Business Management," Part I, by Jas. B. Griffith; "Factory Manager and Accountant," by Horace L. Arnold; "Business Administration," by Carl C. Parsons; "Cost Keeping and Management Engineering," by H. P. Gillette and R. T. Dana; "Factory Accounts," by C. E. Hathaway and J. B. Griffith.

Proposed Panama Steamship Line

A fleet of 15 steamships to ply between New York and Seattle and San Francisco by way of the Panama Canal is promised by the incorporation September 5, at Trenton, N. J., of the Atlantic & Pacific Transport Company. It is possible the actual inauguration of the line is contingent on securing the ocean mail service between New York and Colon, New Orleans and Colon, San Francisco and Panama and Seattle and Panama. The capitalization is placed at $15,000,000 and those chiefly interested are understood to include Bernard N. Baker, Baltimore, former president of the Atlantic Transport Line; James S. Whiteley, former vice-president of that line; C. G. Heim, former treasurer, and T. B. Harrison, former secretary, all of Baltimore, and Adrian H. Boole, Washington, at one time identified with the Wilson Line. The mail contracts, it is stated, require stops by the ships at Savannah, Ga., or Charleston, S. C., and at San Pedro, Cal., or San Diego, Cal.

S. L. Bassett and H. E. Vogel, former secretary of the Machinists' Supply Company, Pittsburgh, have formed the Bassett-Vogel Company, 9 Market street, Pittsburgh, to act as manufacturers' representatives for the sale of leather and canvas belting, mechanical rubber goods, twist drills, reamers, taps, etc. A stock will be carried to fill orders promptly.

A patent on a grinding machine granted August 15 has been assigned by Bengt M. W. Hanson and Carl L. Grohmann, Hartford, Conn., to the Pratt & Whitney Company. Mr. Hanson has also assigned to the company a patent awarded August 15 covering a metal working machine and involving a head stock with means for supporting a tool as well as the spindle.

Imports of Ferrosilicon and Other Ferroalloys

Quarterly publication is made by the Bureau of Statistics, Department of Commerce and Labor, of the details of merchandise imports to the United States. From these statistics the following figures are taken, showing imports of ferrosilicon by quarters in the past two fiscal years. No imports of ferrosilicon containing 15 per cent. silicon or less are reported for the first half of this year:

Imports of Ferrosilicon to the United States—Gross Tons.

Quarter Ending—	15 Per Cent. Silicon or Less. Duty $5 Per Ton.	More Than 15 Per Cent. Silicon. Duty 20 Per Cent.
September 30, 1909*	616	880
December 31, 1909	2,050	1,373
March 31, 1910	400	1,752
June 30, 1910	750	2,273
September 30, 1910	425	2,120
December 31, 1910	665	3,005
March 31, 1911	...	2,262
June 30, 1911	....	1,609

*From August 5, when the Payne-Aldrich duty went into effect. Between July 1 and August 5, 3,717 tons was imported under the $4 duty.

The imports of ferromanganese and spiegeleisen in the first quarter of the past fiscal year were 35,890 tons; in the second quarter 34,937 tons, and in the third quarter 29,018 tons. The ferrophosphorus imports were 25 tons in the first quarter, 90 tons in the second and 50 tons in the third. Of tungsten or wolfram metal and ferrotungsten the imports were 124 tons, 108 tons and 288.65 tons for the three quarters respectively. The imports of molybdenum and ferromolybdenum for the three quarters were 8.04 tons valued at $11,373. Chrome and ferrochrome imports valued at $200 a ton or less were 234 tons, 207 tons and 76 tons respectively in the three quarters; valued at more than $200 a ton—27 tons, 10.02 tons and 5 tons respectively.

The Swedish Iron and Steel Corporation

Based upon reports from the trade, which constitute an almost unanimous expression of approval of Sisco Acorn Swedish steel, says the Swedish Iron and Steel Corporation, 12 Platt street, New York, it is arranging to bring in a complete stock of the following steels: Hot and cold forging die steel, up to 12 in. square, and 11 x 13 in. flats; sheet steel, Nos. 9 to 28 gauge; coils, 3/16 to 5/8 in. round and square, and a large assortment of other special material to meet special demands, suggested by numerous favorably disposed manufacturing concerns.

This company is at the present time carrying somewhat in excess of 4000 tons of Swedish die, tool and drill steels, and reports that the month of August was a record breaking month, for both the New York and New Orleans houses. This does not mean so much that general business conditions have improved, but indicates that the trade, having conducted long and complete tests covering a period of two years or more, under the present regime, has decided that Swedish steel, of the grades offered by this company, is suitable for the purposes for which it has recommended their use, the business of the month of August constituting an expression of the trade's confidence in the Swedish Iron and Steel Corporation.

Machinery arrangement, artificial shop lighting and the advantages and disadvantages of concrete floors, composition floors and wood floors for manufacturing plants are to be made the special subject for a meeting Tuesday evening, October 10, of the American Society of Mechanical Engineers, at the Engineering Societies Building, 29 West Thirty-ninth street, New York City.

The nomination of officers for the next year of the American Society of Mechanical Engineers has been announced as follows: President, Dr. Alexander C. Humphreys, president Stevens Institute, Hoboken, N. J.; vice-presidents, for two years, Prof. William F. Durand, Leland Stanford University, Stanford, Cal.; Ira N. Hollis, Harvard University, Cambridge, Mass.; Thomas B. Stearns, Denver, Col.; managers for three years, Charles J. Davidson, Milwaukee Electric Railway & Light Company, Milwaukee, Wis.; Henry Hess, president Hess-Bright Mfg. Company, Philadelphia, Pa.; George A. Orrok, mechanical engineer New York Edison Company, New York, N. Y.; treasurer, William H. Wiley.

Coal Production in 1910

For the first time in the history of the United States the coal mines of the country in 1910 were credited with an output exceeding half a billion net tons (2000 lb.), the combined production of anthracite, bituminous coal and lignite having amounted to 501,576,895 tons, with a spot value of $629,529,745. This great output, according to Edward W. Parker, coal statistician of the United States Geological Survey, was attained in spite of the fact that most of the mines in Illinois, Missouri, Kansas, Arkansas, and Oklahoma were closed for nearly six months by one of the most bitterly contested strikes in the history of the industry. The heaviest tonnage mined in any year previous to 1910 was in 1907, when a total of 480,363,424 net tons was produced.

Compared with 1909 the output in 1910 showed an increase of 40,762,279 net tons, or 8.85 per cent. Except for the States affected by the strike order the increase in production was general among the more important coal-producing States. The output of anthracite in Pennsylvania increased from 81,070,359 tons, valued at $149,181,587, to 84,485,236 tons, valued at $160,275,302, a gain of 4.21 per cent. in quantity and 7.44 per cent. in value. The bituminous production, including semi-anthracite, semi-bituminous, canal, splint, and sub-bituminous coals, lignite, and a small quantity of anthracite from Colorado and New Mexico, increased from 379,744,257 tons, valued at $405,486,777, to 417,091,659 tons, valued at $469,254,443, a gain of 9.83 per cent. in quantity and of 15.73 per cent. in value.

The total increase of 40,762,279 tons in 1910 over 1909 was equal to 20 per cent. more than the entire output of the United States in 1870 and more than half of the total output in 1880. The largest increases in production in 1910 were in the States that benefited from the idleness in the Mississippi Valley. The bituminous coal mines of Pennsylvania showed the largest increase, 12,554,735 tons. West Virginia was second, with an increase of 9,821,799 tons; Ohio third, 6,270,027 tons; Kentucky, fourth, 3,925,935 tons; Indiana fifth, 3,555,556 tons, and Alabama sixth, 2,388,529 tons.

Standard versus Heavy Duty Shapers

Only about one machine shop in a hundred requires a heavy duty shaper if the castings and forgings are made as they should be. Such is the opinion of the Ohio Machine Tool Company, maker of planers and shapers, Kenton, Ohio. It is emphasized that if patterns are correct the metal brought to the shaper ought not have a large excess of metal to be removed, and heavy duty shapers, representing a large investment and therefore a large overhead expense, as well as involving considerable friction load, are not necessary. A letter from C. C. Swift, secretary and treasurer of the company, remarks that there is too great a tendency on the part of managers of machine shops to purchase heavy machine tools where the work required could be done on lighter machines just as easily, more handily and even with greater output—all tending to cut down the overhead expenses. The company has been manufacturing a line of planers and shapers for some 20 years. The Ohio standard pattern shapers are built single or back geared, with 16 in., 18 in. or 22-in. stroke, but the company also manufactures a heavy duty 24-in. back-geared shaper. The company is contemplating an addition of a 60 x 100 ft. building for increasing its facilities.

Data prepared by the Bureau of Railway Economics in Washington indicate that while the railroads found their labor bills in total substantially heavier in the fiscal year 1911 than in 1910, at the same time the effort to retrench operating expenses by reducing forces has been conducted on a considerable scale for many months past, instead of having resulted from the demand of shopmen on Western railroads for increased pay and the closed shop, as has been generally supposed. Information received from a number of important systems shows a reduction of 9 per cent. in the number of employees April 30, 1911, as compared with those on payrolls April 30, 1911. The same rate of reduction for all the railroads of the country would mean that about 145,000 men had been thrown out of employment.

The Stock Process for Steel Castings

A Small Bessemer Converter Equipped with an "Economizer" and Using Fuel Oil for Melting

Interesting results have been secured at the works of the Darlington Forge Company, Ltd., Darlington, England, by the use of a new type of small Bessemer converter on which patents covering the construction and the process have been secured by Guy J. Stock, of Darlington. The practice at the Darlington plant has been developed in the past 21 months, the converter in use there being of three tons capacity. At seven other steel foundries in Great Britain the Stock converter is either in use or is being installed. Thos. Firth & Sons, Ltd., Sheffield, England, have ordered a second plant, which will give that firm a 3-ton and a ½-ton converter.

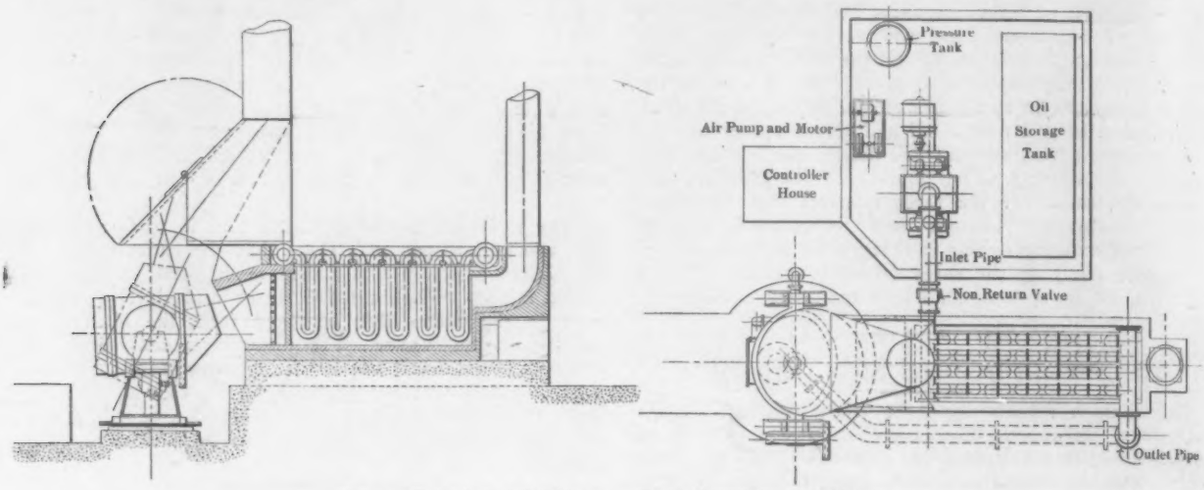


Fig. 1—Elevation and Plan of a Stock Converter Installation.

One of the features of the Stock process is that the cupola is dispensed with; the melting of the metal previous to blowing is accomplished in the converter itself, crude oil being used as fuel. Another feature is that there is an "economizer", as the inventor terms it, consisting of a series of U-shaped pipes and between these the hot waste gases resulting from the melting operation are led,

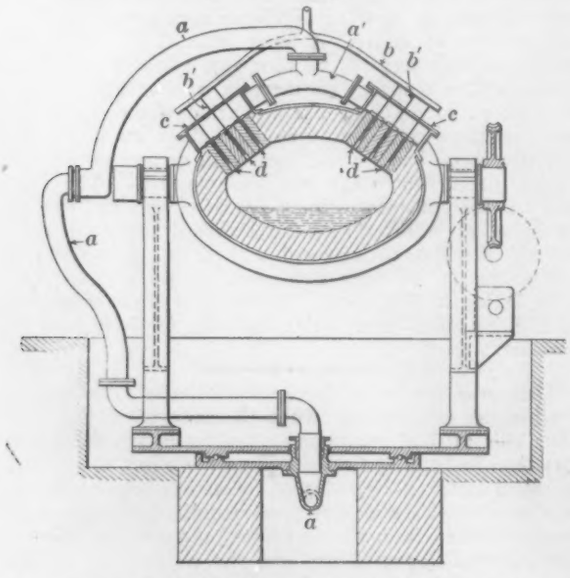


Fig. 2.—Section of Stock Converter, Showing Blast and Oil Pipes and Oil Jets for Melting

the blast in turn passing through these heated pipes to the converter.

Fig. 1 gives an elevation and plan of a Stock converter installation, and in Fig. 2 is a section showing the arrangement of the tuyeres and of the oil and blast pipes.

The vessel is made of oval section so as to expose the largest possible surface of the metal to the action of the oil burners, and the tuyere box was designed for the most effective action of the blast and of the oil jets. The converter is lined with silica brick running up to a thickness of 13 in. around the tuyeres. For convenience of working, in addition to the mounting on trunnions working in roller bearings a turntable is provided for the revolution of the vessel. The purpose of this arrangement is illustrated in Figs. 3 to 5. In Fig. 3 the vessel is in the position for charging, which is effected by the use of a peel. By this method it is stated three tons of pig iron and scrap can be charged by three men in about ten minutes. After charging, the vessel is moved through an angle of 90 deg. into the position for melting, as shown in Fig. 4. Here the nose of the converter is pointed toward the air heater or economizer. The hot gases from the burning oil are drawn through the heater by means of the chimney stack, as shown in Fig 1. Blast is supplied in the case of the 3-ton converter by a Roots pressure blower with a capacity of 3000 cu. ft. per minute, the blowing pressure varying from ¾ lb. per sq. in. for melting to 3½ lb. per sq. in. as the maximum for converting.

Air from the blower is delivered into the heater through the inlet pipe shown in the plan in Fig 1, and after passing through the system of pipes goes to the converter through the pipe *a*, Fig. 2, which terminates in a two-way branch pipe *a'*, leading into the blast boxes *cc* and through the tuyeres *d* into the vessel. The oil supply pipe is shown at *b*, and *b'b'* are small oil jets extending from it into the tuyeres. In melting, the air which passes through the tuyere enters the vessel at a temperature of about 800 deg. Fahrenheit, and in the burning of the oil a very close approach to perfect combustion has been secured. With a 3-ton converter the metal is melted in about 1½ hours. The blow which follows takes from 15 to 25 minutes. Thus a blow every 2 hours can ordinarily be made. The converter is shown in the position for blowing in Fig. 5, the necessary hood and chimney for carrying away the products of combustion being fixed directly above the air heater. The vessel is brought into position for pouring by turning it through 180 deg. in a horizontal plane from the position occupied during the blow.

The oil used for melting is forced by the blower or by an air compressor into a smaller tank which contains a sufficient quantity for five to six meltings. This service tank is fitted with a coil through which hot air or steam can circulate so as to decrease the viscosity of the oil. The tank is connected to a small independently driven compressor, maintaining a constant pressure of 30 to 35 lb. per

sq. in., forcing the necessary amount of oil through a flexible tube to the oil tubes in the tuyere box. These latter are steel tubes with an internal diameter of about 1/16 in. and point through the center of the tuyeres. When the melting operation is completed these oil pipes are withdrawn, the tuyere box being so arranged that this can be done in a few seconds.

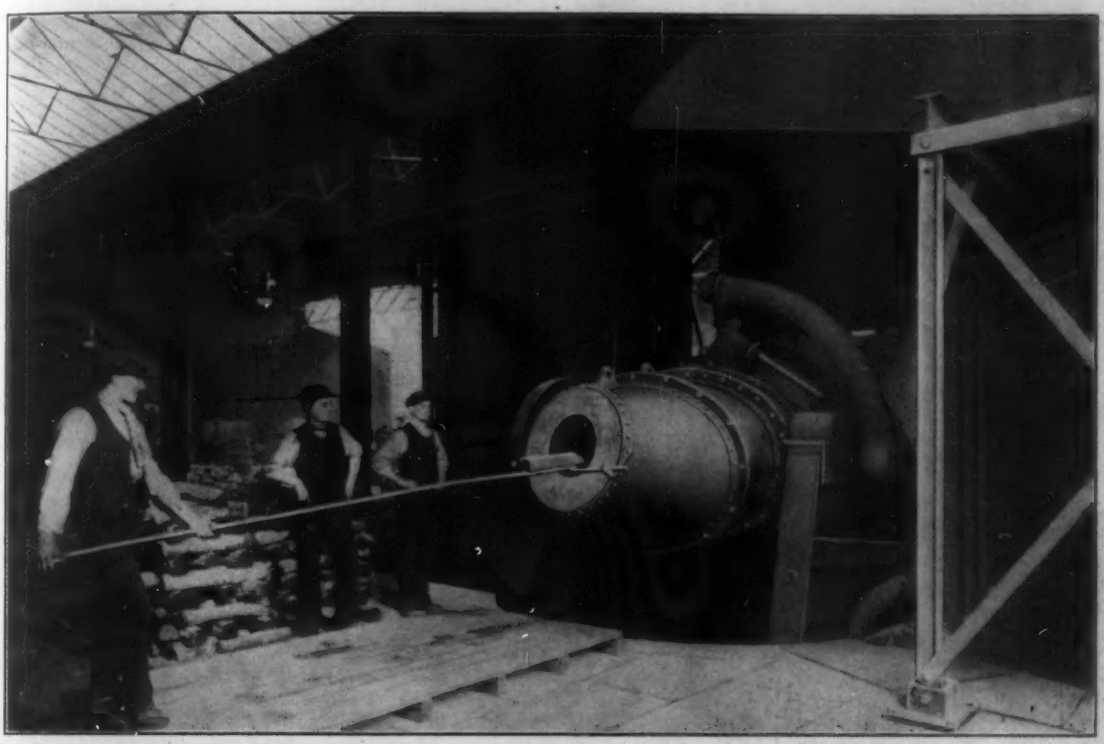


Fig. 3.—Charging the Converter.

In addition to dispensing with a cupola and providing the economizer for preheating the air, the advantages of the Stock converter are stated as follows: With liquid fuel for melting there is no taking up of impurities in this process. The high temperature of the melted charge permits of using pig iron low in silicon as well as high percentages of scrap. A very fluid steel is secured, making it possible to use this process for the manufacture of difficult and intricate castings. The products manufactured from Stock converter steel include wheel centers, high carbon steel wire, low carbon seamless drawn tubes, chipping and calking chisels and pneumatic tools; also high-speed tools for steel containing tungsten, chromium and vanadium.

With an operation of 52 tons a week in a 3-ton Stock converter, working single shift, the cost per ton has been worked out as shown below. The cost of the charge in this table is based on a price of 60 shillings or $14.58 per ton for Bessemer, or hematite, iron, and an ascertained loss of 13 per cent. in conversion, with a further loss of 3¼ per cent. in ladle spillings and floor scrap:

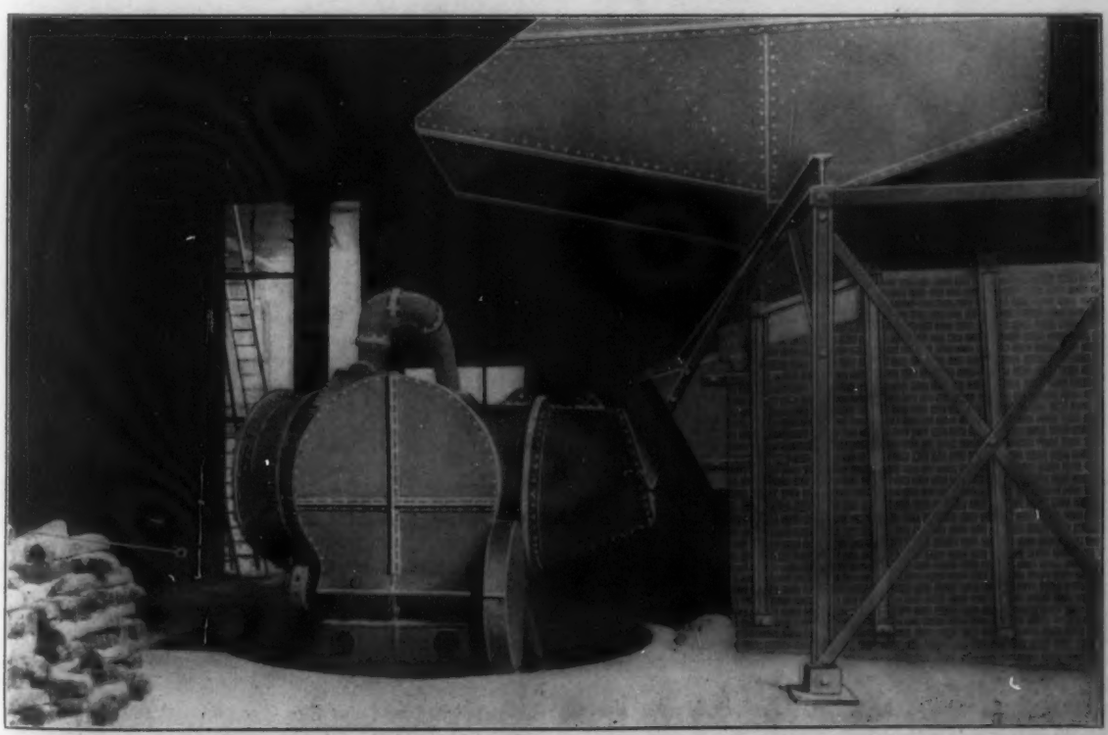


Fig. 4.—Position for Melting, the Waste Gases Being Drawn Through the Economizer.

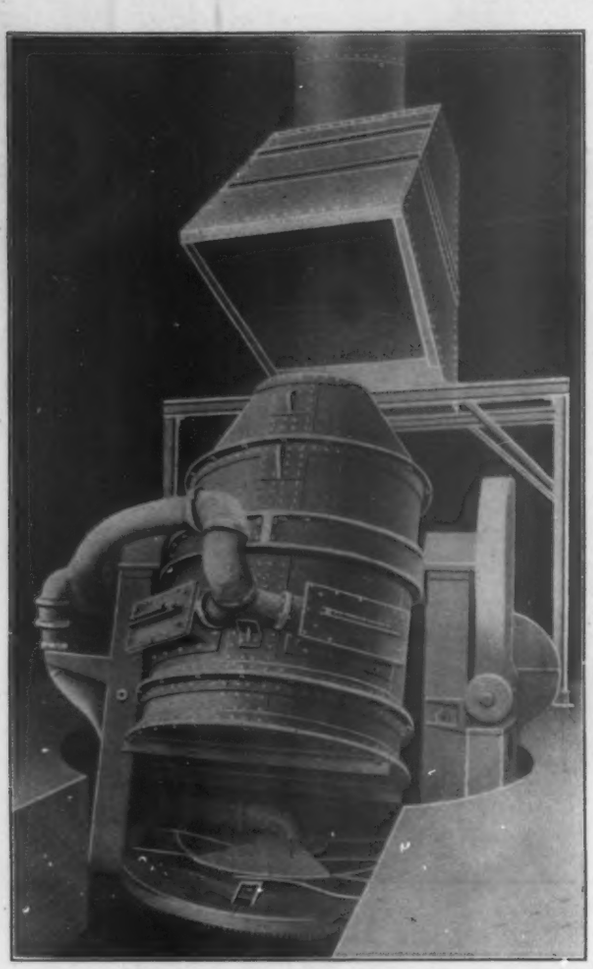


Fig. 5.—Converter in Position for Blowing.

Cost of Steel Produced in a 3-ton Stock Converter.

Metal and mixings (23 cwt. 3 qr. 10 lb.)		$17.02
Fuel oil (40½ gal. at 5 cents per gal.)		2.03
Electric power (42 units at 1 cent per unit)		.42
Direct wages		.73
General repairs and upkeep, including linings		1.70
Cost of converted metal		$21.90
Add allowance for ladle linings and repairs		.50
Cost of metal in molds		$22.40
Add allowance for depreciation and interest	$0.53	
Add allowance to cover royalty charges	.83	1.36
Total cost of steel		$23.76

Analysis: Carbon, 0.22 per cent.; Manganese, 0.508 per cent.; Silicon, 0.130 per cent.; Sulphur, 0.014 per cent.; Phosphorus, 0.041 per cent.

Table 2.—Result of Seven Tensile and Bending Tests of Stock Converter Steel.

Test No.	Description.	Original area. In.	T.S. 1,000 lb. per sq. in. orig. area.	Contraction. Per Cent.	Elongation. In.	Elongation. Per cent.	Bend.
1	12 Roof bars	0.50	27.4	54.3	3	30.0	180° N.B. 1 in. sq.
2	4 Radial wheels	0.50	28.0	50.8	3	34.0	" " "
3	1 Ford. bearing keep	0.50	28.8	52.3	3	33.0	" " "
4	1 " " "	0.50	29.6	47.2	3	32.0	" " 1 in. diam.
5	1 Aft. " "	0.50	30.0	52.3	3	32.0	" " "
6	4 Side frames	0.50	29.0	50.8	3	28.0	" " "
7	10 Platform supports	0.50	29.4	51.6	3	30.6	" " "

Analyses.

	No. 1. Per cent.	No. 2. Per cent.	No. 3. Per cent.	No. 4. Per cent.	No. 5. Per cent.	No. 6. Per cent.	No. 7. Per cent.
Carbon	0.22	0.22	0.20	0.23	0.23	0.22	0.22
Manganese	0.607	0.540	0.600	0.567	0.540	0.607	0.540
Silicon	0.273	0.178	0.237	0.285	0.273	0.273	0.296
Sulphur	0.012	0.019	0.013	0.016	0.010	0.012	0.018
Phosphorus	0.020	0.024	0.018	0.029	0.020	0.020	0.025

Charles S. Powell, 165 Broadway, New York, is the agent in the United States for the Stock process. Mr. Powell recently returned from an extended stay in England devoted to a study of the practice at the Darlington steel foundry.

Ohio's State Building Code

Ohio has a remarkable building code which has been in operation since July 31. What is now law is only a part of an ambitious programme being drawn up by the Ohio State Building Code Commission. The code in its entirety is to cover in part the construction, heating and ventilation, sanitation, lighting and electric work of theaters and assembly halls, churches, school buildings, asylums and hospitals, hotels and tenement houses, club and lodge buildings, workshops, warehouses, office buildings and railroad stations.

The law as passed covers theaters, assembly halls, school houses, colleges, seminaries and the like. The third part of the code, which part has also been passed, defines fireproof construction, mill construction, etc., and stipulates the requirements regarding fire walls and fire stops, fire doors, shaft and belt openings, rolling steel doors and shutters, fireproof windows, ladders and fire escapes, standpipes and fire extinguishers. Part 4, which has also been passed, covers sanitation in general, being in fact an extended State plumbing code. The remainder, covering the general subjects of heating and ventilation, gas fitting, electric work, elevators, general building construction, strength of materials and the maintenance of business establishments for the selling and handling of oil, varnishes and the like, for the storage of rubbish, for handling garbage, etc., has not yet been formulated or adopted by the Ohio Legislature. The Ohio State Building Code Commission is located in Columbus, with Thomas E. Kearns, chief inspector of workshops, factories and public buildings, as president; John W. Zeuber, State fire marshall, as secretary, and Fred W. Elliott, Chamber of Commerce Building, Columbus, consulting architect.

Fig. 6.—Test Specimens of Steels Represented in Table 2.

The accompanying tables give the analyses and results of physical tests of Stock converter steel. In Table 1 tests are given of two pieces cut out of a 10-in. stop valve which had been subjected to a hydraulic test of 500 lb. per sq. in. Table 2 gives the result of tensile and bending tests of the test pieces shown in Fig. 6. The seven numbers given in the table correspond with those marked on the test pieces in the illustration:

Table 1.—Two Test Pieces cut out of 10-in. Stop Valve.

Test No.	Description.	Orig. area. In.	T. S. 1,000 lb. Per sq. in. of orig. area.	Contraction. Per cent.	Elongation. In.	Elongation. Per cent.
1	10-in. stop valve	0.496	27.8	—	3	31.3
					2	37.0
2	"	0.250	28.4	53.6	2	36

The Baird Spring Making Machines

An increasing demand from spring manufacturers for standard machines for the making of springs has led the Baird Machine Company, Oakville, Conn., to develop a line containing three types, namely: Spring coiling and cutting machine, Fig. 1; spring winding and cutting machines, Figs. 3 and 4, and continuous spring coiling machine, Fig. 2. Some examples of the product are seen in Fig. 5.

The spring coiling and cutting machine is furnished with either die or roll tools, to suit the circumstances of their proposed use. Die tools are more easily changed from one size to another, but their initial cost is greater, as a separate set of tools is necessary for each size of spring. If a company is using the same spring at intervals the method is cheaper in the end.

For jobbing manufacture roll tools are more desirable, as with the same rolls on one diameter of wire any spring within the capacity of the machine can be made by adjusting the mechanism. But gauges may have to be used or tests made in other ways. This type of machine automatically takes the wire from the coil, feeds a predetermined length and coils either right or left hand, open or close coiled springs, and cuts them off. It is capable of receiving attachments for varying the pitch in the spring, such combination. A setting attachment can also be applied to set the spring or take out the initial tension. The machine is made in sizes taking wire up to about 3/16 in. diameter, and will make springs up to about 2 in. diameter,

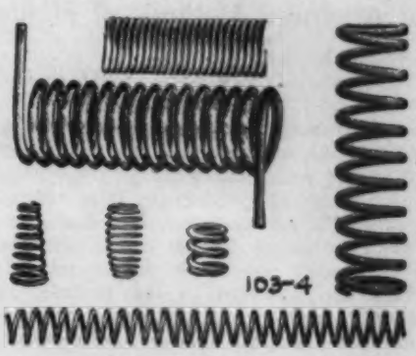


Fig. 5.—Types of Springs Made with Baird Spring Machines.

with quite a wide range of adjustment. It will not make springs with straight ends.

The Baird spring winding and cutting machine uses

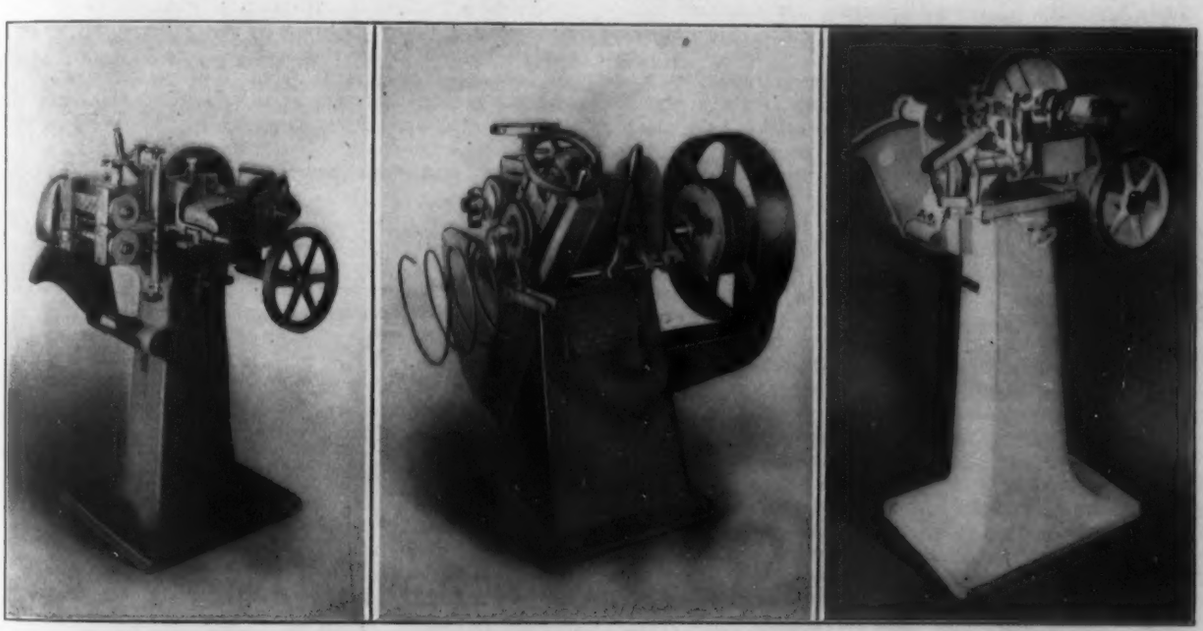


Fig. 1.—Spring Coiling and Cutting Machine. Fig. 2.—Continuous Spring Coiling Machine. Fig. 3.—Spring Winding and Cutting Machine.

MACHINES MADE BY THE BAIRD MACHINE COMPANY, OAKVILLE, CONN.

so that a spring can be made with both open and closed coils, a very common type having squared ends, as shown in the illustration. A diameter changing attachment can also be applied, which will make cone or barrel shaped springs, and the two attachments together would make cone or barrel shaped springs with squared ends, or other

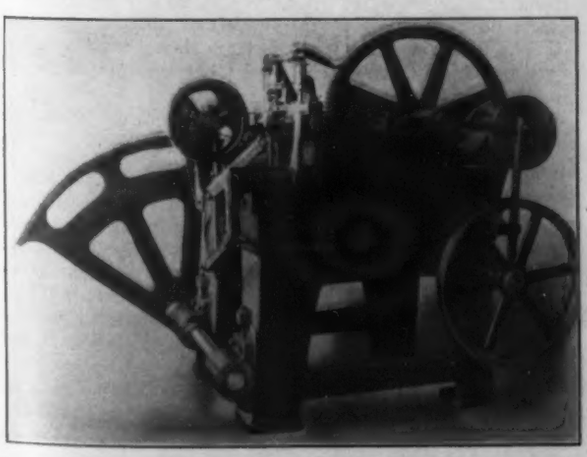


Fig. 4.—Baird No. 2 Spring Winding and Cutting Machine.

an entirely different principle from the coiling machines. They manufacture open or close springs, right or left hand, and some types of cone springs. All have straight ends, but the lengths of the ends may be varied within limits to suit ordinary conditions.

The continuous spring coiling machines are about the same construction as the spring coiling and cutting machines except that the springs are not cut off, this type being used for making the long springs which consume so much wire that it is impracticable to feed such a length. It is also capable of receiving the same attachments for varying the pitch and diameter, or both, as the coiling and cutting machines, with the exception of the setting attachment, so that a long length of spring varying in pitch and diameter for the making of such things as poker handles, etc., can be made and then cut apart into shorter springs by subsequent operations. A type of this coiling machine is shown making a spring of large diameter, the rolls being adjustable.

The Thomas Steel Company, Niles, Ohio, is adding two additional hot mills, one 30-in. and one 36-in., which will make the plant comprise 12 mills. It is also extending the present sheet-bar building about 100 ft. and is putting up a large steel water tank.

The Preparation of Brown Iron Ores*

The Approved Methods of Mining, Transporting and Washing and Concentrating

BY H. S. GEISMER, CHATTANOOGA, TENN.†

There are three general methods available for obtaining commercial brown iron ore: hand-screening, washing, and washing and concentrating.

Hand screening has produced a large tonnage of ore in the past, but is rapidly falling into disuse, except as a preliminary step, largely because modern furnace practice requires all foreign material to be separated from ores before they are delivered to the furnace, and hand-screened ores can rarely be made to fulfill that requirement. Another argument against hand-screening is that the waste pile often contains as much ore as the screen recovers. The operation known as hand screening consists of throwing the ore-bearing material against a stationary inclined screen of 0.5 in. to 0.75 in. mesh, similar in construction to the screens employed in sand pits. The recently prospected brown ore deposits of Cuba seem to offer possibilities for hand screening not possessed by the average American deposit, since these ores are not associated with worthless clays.

Washing and washing and concentrating may be discussed together, since concentrating is never practical on brown iron ore, except to treat ores that have already been washed. (Strictly speaking, washing might be classed as concentrating, but it is never so designated by brown ore men).

The various steps of removing ore-bearing material and converting it into ore suitable for blast furnace use may be grouped under five heads: loading for transportation, transporting, feeding into the washer, washing, and concentrating. These five subjects will be considered in consecutive order. Each of these successive steps may be accomplished in a number of different ways, the choice depending entirely upon the character of the ore-bearing material to be treated.

Brown-ore deposits vary in character:

a. As to size of the ore-fragments—they may vary anywhere from gravel to boulders weighing tons.

b. As to material with which the ore is associated—clay, sand, loam, gravel and chert are all to be classed as ore-bearing material.

c. As to richness of deposits—1 yd. of ore-bearing material may yield 1 ton of ore, while another yard may yield but a thimbleful.

d. As to thickness of deposit—anywhere from blanket deposits a few feet in thickness to concentrate deposits several hundred thick.

e. As to quality of ore—anything from pure limonite to ferruginous sandstone.

f. As to origin—you may choose between "residual," "replacement," and "concentrate;" no matter which of these terms seems to fit your particular deposit, there will be plenty of geologists ready to convince you that your conclusions are erroneous—and perhaps they are. But this question need not be considered in the present inquiry.

I.—Loading

All the methods for loading and transporting earth and rock are applicable at times to the different classes of brown ore deposits. Those most used are: loading with pick and shovel into wheelbarrows, dump carts and wagons drawn by mules, horses or oxen, or tram cars drawn by animals or dinkeys; loading with steam shovels into drop-bottom wagons, tram cars, or side-dump cars of various styles and capacities, from 1 to 12 cu. yd.

The greatest difference between the loading of brown ore dirt and that of earth for railroad building or similar purposes is that the brown ore material cannot always be loaded blindly, but requires careful handling to prevent mixing the ore-bearing materials and the worthless rock with which it is often found intimately associated, and which cannot always be separated from the ore by washing. This consideration often eliminates the steam shovel as a loading device in ore banks that would be otherwise well adapted to that style of loading; and instances are not rare in which washers fed by steam shovels have been abandoned on account of the low quality of ore produced, and at a later date have been successfully operated under management that substituted hand loading for shovel work.

Brown ore deposits are often buried under blankets of worthless clay and sand that require to be stripped off before the ore can be recovered. For this class of stripping the steam shovel is admirably adapted; and the foregoing remarks concerning the care needed to separate ore from foreign material when loading with shovel do not here apply, since the line of separation between the ore-bearing material and the over-burden is well defined. It is generally advisable to carry on such stripping in advance of the mining. The various types of drag line excavators now manufactured present great possibilities in connection with stripping operations, especially where large lean and barren areas have been left surrounded by deep cuts, and subsequent operations require the wasting of these abandoned areas, to permit of mining ore lying at deeper elevations.

The steam shovel is usually a losing proposition, if used in mining shallow deposits. Cuts under 5 ft. in depth can be handled more economically by hand, unless the deposit consists of ore masses too large for hand loading. This mention of large masses suggests another manner in which the steam shovel may interfere with the output of a washer. I refer to the tendency to load with the shovel dipper masses larger than the crusher at the washer will handle, necessitating extra labor and costly delays. The economical place to break down large lumps is in the ore bank, where dynamite can be used freely; but the irresistible tendency in steam shovel work is to load anything that can be handled by the dipper. It would, of course, be possible to install crushers capable of receiving any boulder that could be loaded into a shovel dipper; but, except in rare instances, the cost of such crushers would be prohibitive for brown ore plants.

In districts where steam shovels are used to advantage great variations are noticeable in the type of shovels employed. This generally indicates that at various times the financial standing of the different operators has varied; and the date on the name plate of the largest shovel will probably coincide with the date of the best-filled treasury. The tendency in brown ore mining is toward larger shovels with standard-gage railroad trucks. The old argument that widely separated deposits at varying elevations require light-traction shovels that can be more easily moved about is now answered with, "Small, widely separated deposits do not require steam shovels at all."

The light revolving type of steam shovel was for a time very popular in brown ore work; but, except for following narrow leads of ore, it cannot compete with the large standard type of equipment. The operating costs are nearly the same with the large and small shovels, while the outputs are almost as two to one.

II.—Transporting

The system of transportation to be adopted is regulated largely by the method employed for loading the ore, but each system may permit of variations that may involve startling results. For example, a deposit made up of small scattered pockets, lying at widely different elevations, can only be loaded by hand labor. This would suggest transportation by wagons or mule carts; but, owing to the depth of some of the pockets, the grades become too steep for mule or horse travel; oxen are substituted, and no further trouble is experienced. Again, a change in car design, where self-dumping cars are employed, may greatly affect the economy of transportation.

*From the Bulletin of the American Institute of Mining Engineers, August, 1911. Articles on "The Brown Iron Ores of Alabama" appeared in *The Iron Age* for 1908 as follows: June 4, p. 1788; June 11, p. 1856; June 25, p. 2008; July 9, p. 108; August 6, p. 381; September 3, p. 632.

†Chattanooga district manager, Southern Iron & Steel Company.

The richness of a deposit needs small consideration in planning the method for loading, but it has a marked effect on the cost of transportation. The cost of transportation per ton of ore produced will depend upon two conditions: the richness of ore-bearing material (number of cubic yards of material required to produce one ton of ore) and the length of haul from ore-bank to washer. The first is dependent on natural conditions. If the deposit is so lean that transportation by any known system is economically impracticable, there is nothing left to do but abandon the property. The second is largely dependent upon individual judgment in choosing the location for the washer. Present practice seems to favor a large central washing plant, fed by a number of scattered ore banks, in contrast to a small washer located at each deposit. This practice lowers the actual cost of washing the material, but introduces an excessive transportation charge that very often more than offsets such saving.

The thickness of a deposit may limit the choice of systems of transportation that can be adopted. For example, a thick deposit of small area can only be followed down by means of a hoisting engine in connection with an incline or shaft. The method adopted for loading the ore-bearing material may determine the system of transportation required. Mechanical loading, for example, requires mechanical haulage. When dinkeys and side-dump cars are used for transportation in connection with shovel-loading it is generally advisable to have this equipment and the shovel of standard-gauge design; this allows great flexibility in the shifting of the equipment, besides making it possible to handle railroad equipment, such as car loads of coal, to any point of the operation.

In connection with shovel-loading, the transportation requires careful watching. Unless the shovel can be kept at work continually it will not show a satisfactory cost; and the only way to accomplish this is so to arrange the system of transportation that the shovel-loading track is always supplied with empty cars.

III.—Feeding the Material into the Washer

When the ore-bearing material arrives at the washer it is dumped on to a grizzly, made up of parallel iron bars or rails with 3-in. openings between them. The fine material which falls through the openings passes directly into the log box or falls into a mud box and is carried to the log box by a flume. The coarse material rejected by the grizzly may be handled in several different ways: broken down with hammers, as it rests on the grizzly bars, until it will pass through the openings; or carried down the grizzly bars (this requires that the bars be set at an inclination of about 30 deg.), and delivered into a crusher, from which it passes into the log box; or delivered from the end of the grizzly bars directly into an overhead screen, the fines passing through the screen into the log box while the coarse goes directly into the loading bin.

The output that can be obtained from a washer is often limited directly by the amount of material that can be handled through the grizzly; and yet, in most instances, little attention is paid to the grizzly design, either as to the area required for it or the manner of delivering material to and from it.

To design a grizzly properly, two determinations are required: (*a*) the size of the ore fragments as delivered to the grizzly; and (*b*) the character of ore-bearing material (mud, clay, sand, gravel, etc.) delivered upon the grizzly with the ore.

When the ore occurs principally as large "dornicks" the grizzly area must be large. If the grizzly bars are horizontal, a large number of men will be required to hammer the lumps through; and if they are inclined, the material must be spread over a large area, to prevent the lumps from blocking the openings. A nozzle, delivering water at about 100-lb. pressure, is of great service in separating the fine material from the coarse and forcing the fines through the bars.

If the ore occurs in small pieces, varying in size from gravel to cobblestones, imbedded in stiff clay, the grizzly must be designed to effect a partial breaking-down of the clay mass, or the resulting product at the washer will consist largely of clay balls. This can best be accomplished by the use of giant nozzles. However, it is not always possible to separate the ore sufficiently from the clay; and a good many rich ore deposits are not workable because of this fact.

If the ore-bearing material as delivered to the grizzly contains a considerable quantity of soft, nearly decomposed sand boulders, opportunity must be afforded to separate them from the material being delivered into the logs; for, when once in contact with the logs, they are quickly broken up and can then only be separated from the ore product by jigging.

In connection with the delivery of ore-bearing material from grizzly to the washer, the possibilities of a flume are often overlooked. A flume not only offers a cheap and convenient method for transporting the material between these two points, but is also of considerable advantage to the washer. In fact, some ores require no further treatment than to be made to travel several hundred feet down a gravity flume. A metal-lined flume requires a minimum inclination of 11 deg.

IV.—Washing

The ordinary log washer of the "ground-hog" variety is probably not a curiosity in any State of the Union; nor should we marvel at this, when we consider its wide usefulness, coupled with its history, which dates back to ancient Greece. The so-called modern washing plant differs little from the earlier variety as regards log design, the difference being mainly noticeable in the accessories that have been added. Nor are the results obtained in these modern plants always entirely different from the results obtained in the less pretentious old ones. In too many instances the modern plant is simply a copy of a neighboring successful one, and, while the original design may have required all the extra trimmings, the latter plant did not; and it is quite possible that the trimmings effect a waste rather than a saving. The flow-sheet for a complete plant would show the following:

All material is delivered into a revolving conical overhead screen. The oversize passes out at the end, of the screen on a picking belt, from which it is delivered to a crusher, thence on to another picking belt, and then directly into the railroad cars or storage bins. Very often the crusher is omitted and the material passes from the overhead screen to a picking belt and is delivered to the loading bins. The undersize from the overhead screen passes directly into the lower end of the log washer. During the passage along the logs most of the loose dirt is separated from the rock material and flows out at the lower end of the logs with the water overflow. The rock material passes out at the upper end of the log and is delivered into a sand screen. The oversize from the sand screen passes on a picking belt for delivery into bins or railroad cars. The undersize is either sluiced to jigs for treatment or is carried away with the waste water.

As a rule the proper functions of the various accessories do not receive proper study; and when once installed they are operated continuously, even though they may be responsible for useles waste. The work that each part of the washer equipment may be expected to accomplish is not necessarily shrouded in mystery, and the limitations of each are easily determined.

OVERHEAD SCREEN

The principal object of this screen should be to eliminate from the washer feed all material that is too large to be handled by the logs. It is true that in passing through this screen much dirt may be separated from the large boulders by means of numerous nozzles delivering water under pressure, but it is also true that this dirt would be more effectively removed could the dornicks be handled in the washer.

If the ore material carries a large proportion of sand boulders, the screen is of great advantage, since it cleanses these boulders and permits them to be easily detected by the picker boys before they reach the crusher.

In some deposits the large lumps of ore are comparatively close-grained (in contrast to the honeycomb structure generally characteristic of ore boulders), and a thorough rinsing is all that is required to make them marketable; with such deposits the overhead screen will increase the capacity of the washer considerably, as it can be arranged to handle all of the lump ore, leaving only the fines for the logs.

If the ore-bearing material consists largely of loam and sand, the overhead screen will be very effective. On the other hand, if the material consists of small ore particles imbedded in clay which tends to concentrate

into clay balls, the screen cannot be depended upon to effect a separation and may produce great waste of ore. The explanation is that the clay, in "balling up," carries with it most of the ore particles; and, since the balls produced are too large to pass through the screen, they are delivered from the end of the screen on the picking belt and are then thrown away by the picker boys. Or, if they are not thrown away, their clay content will materially affect the resulting ore analysis. The best way to overcome this difficulty is to abandon the overhead screen temporarily at least, and pass all of the material through the logs.

LOG WASHERS

The function of the log is usually overestimated. Logs, if properly designed and erected, will eliminate from all classes of rock material, clay, loam and sand. They will not separate pyrites, quartz and limestone from ore. Yet logs are continually being erected to handle material that consists of one-fourth ore and three-fourths useless rock.

Almost the only change effected in the design of logs during the past 1000 years is the substitution, to a limited extent, of steel for wood. Each type has its advantages. The steel log is higher in first cost, but in permanent plants its longer life will offset this difference. Its principal disadvantage is that it does not permit the variations in lug-spacing so effectively employed with wooden logs when the character of the material handled changes suddenly. The principal disadvantage of the wooden log is, that it is liable to break if overloaded with large dornicks, and, at best, is short-lived. In some localities it is impossible to obtain timber suitable for logs. In the manner of driving log washers recent practice has substituted intermediate friction drivers to eleminate "breaking pins" or, worse still, breaking gears. To obtain satisfactory results from any type of log washer an adequate supply of water is an absolute necessity.

CRUSHERS

Crushers may be installed to accomplish any one of three things:

1. Reducing dornick ore to a size considered satisfactory by the furnace manager who buys the ore. This may be anything from 1-in. ring to 6-in. ring.

2. Reducing dornicks of the honeycomb type to permit their being effectively handled in a log washer. The cavities in ore of this type are filled with clay, and unless they are broken down into small sizes the clay cannot be eliminated by the washer. The following figures show the effect of installing a crusher between grizzly and washer at a plant operated by me several years ago:

Average of Ore Loaded in Railroad Cars.

Before Installing Crusher.

	Metallic Iron. Per Cent.	Silica. Per Cent.	Alumina. Per Cent.
August 4	44.33	16.32	4.02
August 11	48.37	11.44	3.09
August 19	44.48	16.80	4.28
August 26	46.74	13.90	4.30

After Installing Crusher.

	Metallic Iron. Per Cent.	Silica. Per Cent.	Alumina. Per Cent.
September 4	48.21	12.04	3.61
September 11	49.11	10.76	3.60
September 18	47.77	12.50	3.80
September 25	49.80	11.52	3.78

3. Crushing breccia dornicks consisting of loosely cemented fragments of rock and ore to a size that will allow them to be fed into jigs. Deposits that would be materially benefited by such treatment are rare and very careful experiments should be made before installing a crusher for such duty.

SAND SCREENS

Most of the sand contained in the material delivered to the log washer passes along the logs and is delivered with the ore product. This has led to the practice of passing all material from the washer-discharge into a revolving screen made of wire cloth about ⅛-in. mesh. A stream of water playing on the inside of this screen forces most of the sand out. It also forces all the ore fines out; and, in many plants, investigation reveals the fact that the material passing through the sand screen is superior to that recovered. Constant sampling of the tailings from any washer is always to be recommended. If the tailings contain a large percentage of ore, and yet are too siliceous to be marketable, the feasibility of recovering the ore by means of concentrators should be investigated. When jigging is employed all of the material passing through the sand screen should be delivered to the jigs for treatment. This permits variations in the size of openings in the sand screen; and careful experiments are required to determine just what size of material should be allowed to pass through the screen into the jigs. In most deposits material that will be rejected by screens having 1.5-in. perforations is not materially benefited by jigging.

PICKING BELTS

Picking belts, as the name implies, are slow-moving conveyors of any description that afford opportunity to pick out clay balls and worthless rock from the ore product as delivered by the washer. If the ore is crushed before being delivered to the washer, picking belts are generally installed to feed the crusher. To be effective all of the material on the belt must be thoroughly rinsed by numerous sprays before passing the picker boys; otherwise the material is liable to be so covered with mud that it is impossible to distinguish between the ore and refuse. Picking belts are worthless unless manned by a sufficient number of competent pickers to separate the waste material during its passage between washer and bin; yet such belts are often turned over to one or two boys without further thought or supervision.

The greatest opportunity afforded for improvement in the methods now practised at brown ore washers would seem to be in connection with these picking belts. Attachments making it possible to replace with mechanical separation the present unreliable hand picking will undoubtedly be perfected in the near future.

V.—Concentration

For concentrating brown ore (beyond the results that may be obtained in a washer) three means are available, although only one (jigs) has been adopted to any great extent. I refer to jigs, reciprocating tables and magnetic and electrostatic separators. The effectiveness of concentrators is dependent on three things: the size of the ore, the material with which the ore is associated and the quality of the ore.

If the crude ore, as delivered on board cars, contains a large amount of fines, say from 1 in. down, and it appears that these fines contain a considerable amount of siliceous material, the substitution of a 1-in. mesh screen in place of the fine mesh standard sand screen and the subsequent concentration of the fines from the screen will probably be advisable. If the ore product consists largely of breccia, made up of sand, rock and ore, crushing and subsequent concentrating may eliminate the siliceous contents. If the ore product contains a large amount of "galvanized" sand rock, which cannot be eliminated by picking belts on account of its resemblance to the ore mass, crushing and subsequent concentrating may be required.

The waste from the ordinary sand screen may carry enough ore to justify the erection of a concentrator, even though none of the rest of the product requires it. Before installing a concentrator in connection with any plant complete tests should be required. Such tests in connection with jigs may reveal the fact that the specific gravity of the ore and rock is so similar that jigs are not effective; again, tests in connection with electrostatic separators may prove them worthless for the purpose intended, because of the large silica content of the ore to be treated. Magnetic and electrostatic separation has received very little attention from brown ore operators up to the present time. The advantages of the reciprocating table have been also quite generally overlooked.

The New Departure Mfg. Company, Bristol, Conn., is sending out a neatly printed set of twelve data sheets ready for insertion in the S. A. E. Hand Book. These sheets cover descriptions of all New Departure ball bearings, in the double row, single row, magneto and new cup and cone types, also accurately compiled tables showing standard press fit and push fit on shaft and in casing, and diagrammatic tables compiled by Frederick Hughes, the company's chief engineer, by which the maximum thrust and radial load capacity of any bearing running at any speed can be easily determined.

The Acme Automatic Engine

Several interesting features have recently been added to the Acme automatic steam engine, which is now manufactured by the Sterling Machine Company, Norwich, Conn., instead of the Rochester Machine Tool Works, Rochester, N. Y., as formerly. The special points of the engine are a marked simplicity of construction and the incorporation of many features found in automobile engines. Fig. 1 is an exterior view of the engine and Fig. 2 shows the constructional details.

The engines are of the vertical two-cylinder single-acting inclosed type with a balanced rocking valve. Three different series of engines are built having strokes ranging from 3½ to 7 in., the length of the stroke in the middle series being 5 in. The series are divided into different sizes of cylinder diameter, the engines of each series being practically identical as regards external appearance and size. This range of sizes covers all the applications to which these engines are adapted, such as the driving of mechanical stokers, rock drills, small friction hoists, belt or direct driven pumping machinery for contractors or irrigation purposes, for direct connection to small gear-driven pumps and for operating small plants, such as laundries and creameries, etc. In addition there are at the present time a number of engines in service on shipboard for driving lighting generators, ammonia compressors and ventilating fans.

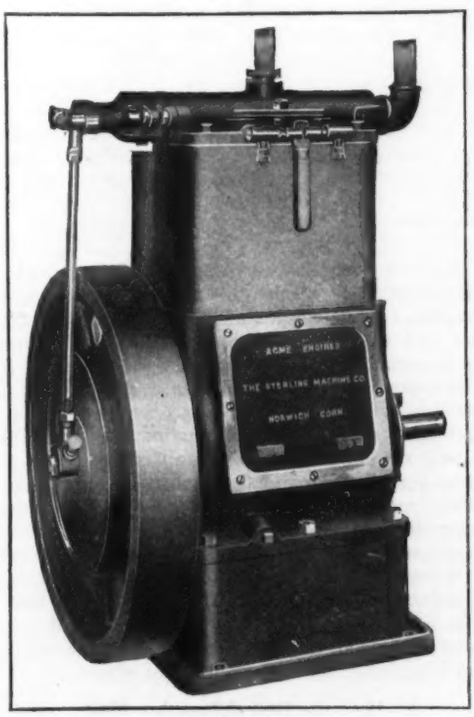


Fig. 1.—The Acme Automatic Engine Built by the Sterling Machine Company, Norwich, Conn.

The influence of automobile engine practice on the design of many of the details is clearly shown in Fig. 2. Drop-forged crankshafts which are ground to size are employed and the connecting rods are of I-beam section bushed with bronze at both ends. The bearing cap at the crank end is held in place by castellated nuts and cotter pins as is commonly the case in automobile work. The piston rings, which are placed two above and one below the wrist pin, are of the diagonal cut type and are ground to size after the cutting operation has been performed. The balanced valve is a single one-piece casting which has been ground on the outside to fit a bored chamber and is fastened to the extended valve stem with a cross key in a similar way to that in which the ordinary Corliss valves are fastened. This valve adjusts itself for wear. Automatic cylinder relief valves are built into the head to relieve any water that would otherwise cause damage.

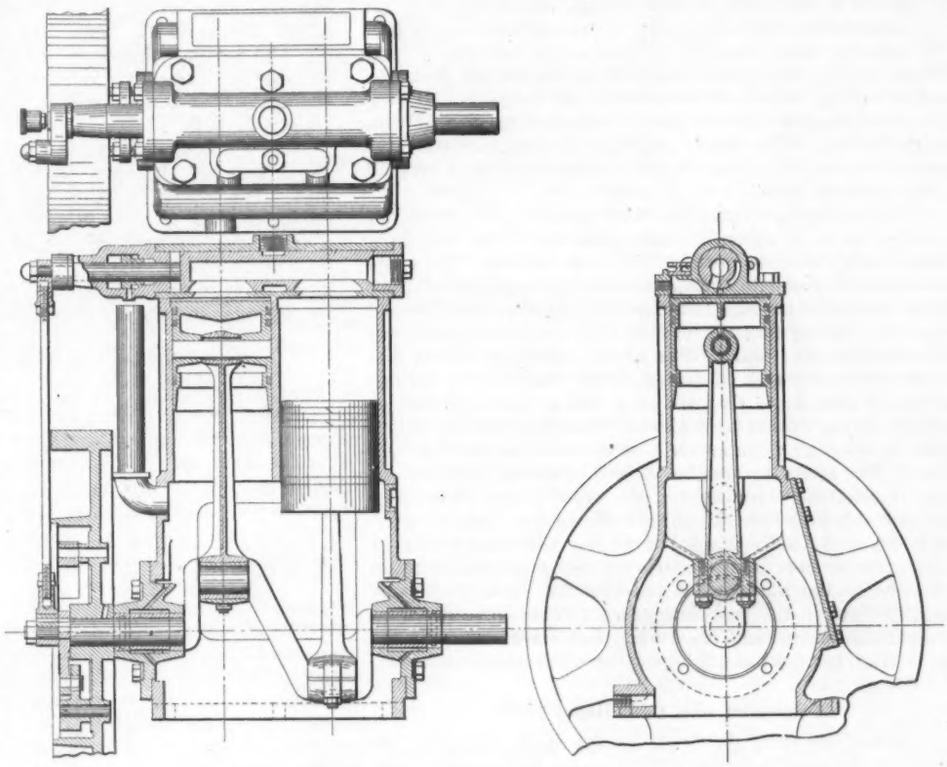


Fig. 2.—Sectional View Showing Constructional Details.

A simple type of governor consisting of four main pieces is employed and the action of the weight is modified by a hardened roller traveling in a milled arc. The entire mechanism is contained in an oil pocket and only the pin to which the lower end of the valve rod is connected extends through. This feature, coupled with the fact that the mechanism is located on the outside of the fly wheel insures easy access. Practically all parts of the engine are lubricated by the internal splash system and there are only two grease cups used. Any water of condensation which may collect and the leakage from the valve stem stuffing box pass down into the base through a vent-pipe at the end of the engine.

As far as possible all parts of the different engines have been made interchangeable. The cylinder diameters of the smallest series, which has a stroke of 3½ in., are 2½, 3 and 3-5/16 in. Four different cylinder bores are furnished in the middle or 5-in. stroke series, the dimensions being 3-5/16, 4, 4-9/16 and 5 in. The largest series of engines, which has a 7-in. stroke, is built with cylinders having diameters of 5, 6 and 7 in.

The blast furnace of the Struthers Furnace Company at Struthers, Ohio, having been relined and repaired, was blown in August 26.

The American Diamond Blast Company, engineer for waterproofing and sand-blast contractors, has moved its offices to 209 West Thirty-third street, New York City.

Alloys Used for Die-Castings

BY E. F. LAKE

In the manufacture of die-castings the metals that can be compounded into alloys are of the utmost importance. In making such castings a commercial success it was necessary to give them a surface as smooth as could be furnished by machining processes and methods. It was also necessary to have them as accurate to size as machined parts. This meant that for the majority of cases an allowance of one-half a thousandth of an inch was all that could be made.

Die-castings are made in steel moulds into which the molten metal is squirted under pressure. The machines, alloys and methods with which such castings are made have been a gradual development through a period of more than 60 years, notwithstanding the fact that some would have us believe that the process is a secret of their own accomplishment. During this period many alterations and improvements have, of course, been made, and castings are now turned out that are as strong as cast iron and as tough as yellow brass, while the immediate future promises to give us castings on a commercial scale that will equal the strength, toughness and wearing qualities of the high-grade bronzes. This development has been brought about by the combined efforts and applied energies of many individuals, but by far the larger part of the progress has been due to the great advancement in metallurgy and the many discoveries that have been made in that field in the past few years. These have given us numerous alloys and mixtures that have much better properties for mechanical application than anything known in the past.

Originated with Lead Bullet Mold

As we may trace the origin of the die-casting principle back to the lead bullet mold that was a household utensil in the American revolution, so we may also trace back to this period the metals or alloys that were used. Starting with the lead used in the manufacture of these bullets other metals were added to harden and strengthen it and give it better wearing qualities.

The printing press required a type of metal that would cast a sharp figure, withstand the necessary compression and be hard enough to wear well, but at the same time be cheap. To pure lead, therefore, tin and antimony were added, and this alloy was cast in metal molds many decades ago. This made the first alloy that was cast in steel molds for machine parts on a commercial scale. An ordinary type metal is made from 80 per cent. lead, 15 per cent. antimony and 5 per cent. tin. This also makes a good bearing metal, and Magnolia anti-friction alloy is of this composition.

The First Machine for Casting Machine Parts

After many years of casting type in metal molds and with automatic machines that squirted the metal into them under pressure, C. and B. H. Dusenbury, in 1877, patented a hand-operated machine with which machine bearings were cast in metal molds. This was doubtless the first machine invented for manufacturing die-castings for machine parts. The main principles on which these earlier casting machines operated are the same as those used in the best die-molded casting machines of the present day. The improvements that have been devised are only in details of construction that make the machine easier to operate and give it a wider range of application.

There has, however, been a vast improvement in the alloys that are made into die-castings. In ordinary practice we frequently meet with die-castings made from alloys whose ingredients may be any of the following metals: Zinc, tin, lead, copper, antimony, bismuth, aluminum, nickel, silver and iron. Iron, however, is nearly always an impurity, while nickel and silver are not used very often.

In these castings the zinc may vary anywhere from 93 to about 30 per cent.; the tin from 65 per cent. to zero; the lead from 93 per cent. down, and the antimony in percentages up to 26. In one instance a copper content of 20 per cent. was used, but in most cases with a copper content of more than 10 per cent. it is difficult to cast the alloy, owing to its action on the molds. In these alloys aluminum has been used in percentages as high as 6. The regular aluminum mixtures, however, have been successfully cast; that is, those that contain a high percentage of aluminum and a low percentage of zinc or copper, or both.

The accompanying table gives the composition of the alloys that are the most frequently met with in die-castings. The harder, tougher and stronger alloys and those having the best wearing properties are shown by those with a zinc base. Where no special strength is required the lead-antimony-tin alloys, such as are used for various kinds of type and anti-friction metals, are often used for die-castings, as they are much cheaper.

Some of the Alloys Used in Die-Molded Castings.

Kind of Alloy	Zinc	Tin	Lead	Copper	Antimony	Aluminum
	92.6	3.5		2	1.5	0.4 a
	92			7	1	a
Leddell's	90			5		5
	89	1		6	1	3
	88.5			4.5		2.5 b
	88	5.5		5	1.5	
Leddell's	87.5			6.5		6
Shonberg's	87	10		3		
Lumen bronze	86			10		4
	85	5		5		5
Ledebur's	85			5	10	
Salge's	84	9.9	1.1	4	1	
	83	5		10		2
Stratton's	82	6	10	1.5	0.5	
Anti-friction	82	6.5	6.5	5		c
Fenton's	79	14		6	1	
Ledebur's	76	17.5		5	1.5	
	74	15		5		6
	74	12		11		3
	73	19		5	2	1
High copper	47	31		20		2
Parson's white bronze	38.5	56.5	0.5	2.5	1.5	0.5 d
Bearing bronze	29	65		4.5	1.5	
Electrotype		3	93		4	
Russian railroad car		2	90		8	
Ordinary bearing		6	87		7	c
Jacoby metal		5	85		10	
Linotype		5	83		12	
Magnolia		5	80		15	
		10	80		10	
Railroad bearing		10	75		15	
Monotype		8	74		18	
Standard white metal		5	71		24	
Graphite metal		15	68		17	
		10	65		25	
Railroad bearing		20	60		20	
Standard type		15	58	1	26	
Hoyle's metal		46	42		12	
Italian railroad car		37	38		25	

a High tensile and low ductility.
b Phosphor-copper 4.5.
c Heavy duty.
d Analysis.
e Heavy load.

While many good die-castings are being made, there are altogether too many produced that have a smooth outer surface while the metal is porous and spongy in the interior and the casting is thus greatly weakened. Many others are made of metal mixtures that disintegrate and thus lose most of their strength in a short time. This is largely due to the fact that many persons engaged in the die-casting business who had a good mechanical knowledge and could design and manufacture machines but who had very little practical information regarding metals and their actions when compounded into the alloys suitable for die-molded castings. Some of these thought it only necessary to throw the metals into a melting pot, melt them down and stir them. Under such methods many poor compositions were made into die-castings that had a smooth outer surface, and as they looked good they were accepted, but soon failed in service. This gave the die-casting business a "black eye" in some places.

How the Best Alloys Are Made

The best alloys for die-castings are made by combining the metals in such a manner that they will enter into solution with one another with no part of them segregating. An easy illustration of this can be made by taking a glass of water and adding salt. A certain amount of salt will dissolve so that the two elements cannot be dis-

tinguished from each other. Thus they have entered into solution. If the water were frozen and the two elements remained undistinguishable, even though examined under a microscope, it would be a solid solution, the same as the metal alloys. If the salt and water were only mixed together in a finely divided state each element could be distinguished from the other by a microscopical examination. With metals this would be called a mixture, while the former would be an alloy. When more salt is added than the water will dissolve it forms around the edge of the glass or settles to the bottom. It thus illustrates the segregation of metals in an alloy or mixture when they are not properly melted and mixed or combined in the correct percentages.

Segregation more often occurs, however, in the center or interior of metals by one element remaining in suspension in the other while it is becoming solid or freezing. Then again, two metals may enter into solution with one another when they are in the molten state, but when the temperature is lowered and they begin to solidify segregation or a separation takes place. Salt and water also act in this way. When freezing, a certain amount of the salt is precipitated, or segregated. By taking the top of the ice off, melting it and again freezing it from 3 to 5 times, salt water can be made fresh enough to drink. While the salt and water illustration is not strictly scientific from a chemical viewpoint it gives a clear idea of the meaning of solid solution. The molecules of metal that form the various mixtures are not bound together by a cohesive force that is strong enough to make them nearly approach the physical properties of the alloys. Thus castings made from them are not as successful for commercial uses.

Lead and copper are two elements that act in a similar manner to salt and water. As high as 20 per cent. of lead can be made to enter into solution with copper and form a homogeneous alloy, but when more lead than this is used it begins to segregate, and 30 or 40 per cent. of lead added to 70 or 60 per cent. of copper will only make a mixture. Of zinc and aluminum 50 per cent. of each can be made into a mixture that will give fairly good results when first cast, but they disintegrate to such an extent that the castings crumble into small particles inside of a year. This alone should emphasize the necessity of having a metallurgist, or some one who thoroughly understands metals, working in conjunction with others when manufacturing die castings.

The Mechanical Work Requires Care

The mechanical work of manufacturing die-castings also needs careful attention, as good alloys can be spoiled in these operations. All metals have a great affinity for oxygen, and to a slightly less degree for hydrogen and nitrogen, when their temperature is raised above normal; the higher the temperature the stronger will be this affinity. It is thus necessary to have the alloys well protected from the air while making them into castings. If this is not done the metals are liable to absorb some of these gases, which may become occluded or segregate enough to form microscopical bubbles or even in large enough quantities to form blow-holes. This, of course, destroys the cohesive force between the molecules separated by these gases and weakens the metal.

With some styles of die-casting machines air pressure has been used over the surface of the bath to force the metal into the molds. This forces air into the molten metal and never results in good castings. In others mechanical means have been used to force the metal into the molds, but nearly always in such a way as would continually keep the bath churned. This draws the gases from the air into the molten metal. Under such conditions the longer the casting machine is operated the poorer will be the castings, as it does not allow the bath to remain quiet for a long enough time for the gas bubbles to rise to the surface, as they would do if not occluded. If castings made under these conditions are broken the holes formed by the gases can often be seen with the naked eye. If not, a small magnifying glass will bring them out clearly. A pronounced segregation of any of the various metals can often be seen also.

In the mechanical operation of making die-castings, therefore, it is of considerable importance to have the retort that holds the molten metal tightly covered and thus protected from the outside atmosphere. The bath should also be kept covered with a flux, to prevent any air that may be in the retort from coming in contact with the metal. Common salt is one of the best fluxes for this purpose. In addition to this the machine should be so designed as to prevent the bath of molten metal from being put in motion when forcing a portion of it into the die mold. Too many die-casting machines have been made without having these details perfected, and thus poor castings have resulted, even when the best of alloys were used.

Zinc

Of the metals used in manufacturing alloys for high tensile die-castings zinc has been by far the largest ingredient, varying from 73 to 93 per cent. In some bearing metals that have been termed white bronzes a zinc content of from 30 to 40 per cent. is used with a high percentage of tin. One alloy that carried 20 per cent. of copper had a zinc content of 47 per cent., with the tin 31 per cent. and aluminum 2 per cent.

Zinc belongs to the same chemical group as cadium and mercury, and has a strong resemblance to magnesium. It occurs in nature in combination with carbon and oxygen or with sulphur or with silicon and oxygen. Zinc ores are first converted into an oxide by roasting and the oxides then reduced by heating them with charcoal. This product is called spelter, and is not pure. The impurities present are lead and iron, and sometimes arsenic and cadmium. Zinc has a brilliant luster of a bluish-white color, and at the ordinary temperatures it is very brittle, with a highly crystalline structure. At from 200 to 300 deg. F. it is easily rolled into sheets, but above 400 deg. it again becomes brittle. It melts at 786 deg. and casts very crystalline if the temperature is raised much above this.

Zinc gives die-castings the proper degree of hardness, but, as it is very low in ductility, other metals have to be added to correct this quality. Alloys with the higher percentages of zinc are quite brittle, but have a greater hardness than when the zinc is low. The toughness can be increased by lowering the zinc content, but it will sacrifice some of the hardness. The required toughness is usually obtained by adding copper to the zinc, but much over 10 per cent. of copper cannot be added, as it raises the melting point of alloys to temperatures at which they will not cast successfully in metal molds.

Copper and Silver

Copper is nearly always found in nature in combination with oxygen or sulphur, or both, and the difficulty of separating it from these is what makes it more expensive than zinc. Large deposits of copper are found, however, that are nearly pure. It is very malleable, ductile, tough and tenacious, and imparts these properties to the metals with which it is alloyed. When from 3 to 5 per cent. of copper is added to zinc it gives the alloy a whiter color than that of pure zinc. The color of the copper does not show in the metal until from 20 to 25 per cent. has been used. After this the higher the percentage of copper the more pronounced will be the copper color.

Copper melts at 1980 deg. F. Thus, if die-casting alloys are very high in copper the metal from which the die-molds are made oxidizes. This formation of oxide occurs at a temperature considerably below the melting point of copper and causes the surface of the dies to wear away when but few castings have been made. Unless a large number can be made to the correct size before the die-molds give out the die castings are not a commercial success. The higher the copper content the sooner will the die-mold be destroyed. In the zinc-base alloys used for die-molded castings copper is used to back up the zinc crystals and thus overcome the crystalline nature of zinc. It therefore adds toughness but does not confer any great strength. Other metals are depended on for this.

As silver belongs to the same chemical group as copper it has been used as an alloying material with more or less success. Its high cost, however, prohibits its use for ordinary purposes. It melts at 1762 deg. F., is softer than copper and is extremely ductile and malleable, with a good tenacity. It is one of the best conductors of heat and electricity.

Tin

Tin belongs to the same chemical group as lead, and nearly always occurs in nature in combination with oxygen, in which case there are two parts of oxygen to one of tin. It melts at 450 deg. F. One peculiar feature of tin is that when a temperature of 50 deg. below zero F.

is reached it slowly assumes a gray color, is very brittle and the specific gravity is lowered. It then begins to crumble and this is known as the tin pest. Hence tin cannot be used in very cold countries.

Tin ranges between nothing and 20 per cent. in die-casting alloys that require strength and toughness. It is then nearly always used in combination with copper and zinc, with a little antimony added. In a high copper alloy, however, the tin content was made 31 per cent., and as high as 65 per cent. has been used in anti-friction alloys.

The strongest, toughest and best die-casting alloys contain from 5 to 10 per cent. of tin. With a high tin percentage die-castings have a very smooth surface, as the alloys seem to spread or flow over the surface of the steel mold better than when but little or no tin is used. Scraper marks put on the surface of the die-mold are plainly reproduced in the castings and all projections and corners are sharply defined. This also makes the highest priced alloy, for which reason there is a tendency to use cheaper metals. The majority of die-castings, are of such small size, however, that the price of the metal is not as much of a factor as the physical properties.

With a tin content ranging between 55 and 65 per cent., a zinc content of 30 to 40 per cent. and the copper from 2 to 5 per cent., with about 1.5 per cent. of antimony, a very good bearing metal can be made and this can be cast accurately to size in the die-casting machines. Parson's white bronze is similar to this in composition. It is much harder and wears longer than the lead-base bearing metals that contain a high percentage of antimony and a low percentage of tin. The latter is about one-third of the price of the former, but the former better withstands the hard usage given to bearings that are designed for parts similar to the crankshaft of an internal combustion engine.

Lead

In the strong, tough alloys lead is never used, but many die-castings are made from alloys having a lead base and containing high percentages of antimony. The tin in these ordinarily varies from 2 to 20 per cent., but in some of the bearing alloys as high as 46 per cent. has been used, with 42 per cent. of lead and 12 per cent. of antimony. The lead ordinarily varies from 58 to 93 per cent. and the antimony from 4 to 26 per cent. These alloys were first perfected for use in anti-frictional bearings and later for casting into type in metal molds. Here the die-casting of machine parts started. Bearings were cast accurately to size in die-molds and small, instrument and machine parts that required no particular strength, toughness, etc., were die-cast from these alloys. After this the alloys were much improved in their physical properties and machine parts were die-cast from better metals.

Lead has a bluish-gray color and a high lustre. It is very malleable and ductile, with a very low tenacity. It is also very dense, but all of the base metals lower its density when alloyed therewith. Its melting point is 620 deg. F. When in a finely divided state it can be pressed into a solid compact mass, or two clean surfaces can easily be welded together by pressure, even when quite cold. Being soft and malleable it can be whittled with a knife or squirted into the form of tubes, rods or more intricate shapes.

These properties make lead especially applicable for die-castings, but its shrinkage is so great, its tensile and compressive strength so very low and its softness such that it has to be alloyed with other metals that overcome these faults. Lead only enters into solution with zinc to a very limited degree and hence they are seldom used in the same composition. No matter how well they may be mixed in the liquid state they separate into layers before the temperature is lowered to the freezing point. The zinc layer carries a very small percentage of lead in solution and the lead layer has a very small percentage of zinc in solution.

When heated to between 1650 and 1800 deg. F. lead and zinc enter into complete solution, but as this temperature is lowered they continue to separate until the freezing temperature is reached. If it were possible to cool them suddenly from 1650 to 1800 deg., the total solubility could be retained. The longer the elapsed period of time during which the temperature is lowering from 1650 deg. to the freezing point the more complete will be the separation of the metals. The oftener these metals are melted and cooled the more complete also will be the separation. This, again, is very similar in action to the salt and water solution, previously mentioned, which is made fresh enough for drinking purposes by continued freezing and melting; some salt being condensed each time the water is frozen.

Antimony and Bismuth

Antimony belongs to the same chemical group as phosphorus, arsenic and bismuth. It occurs in nature in the free state and also in combination with sulphur. It is hard and brittle, with a silvery-white color and a high metallic lustre. It imparts hardness to lead, and hence the degree of hardness that is desired in type or bearing metals can be obtained by varying the percentage of antimony. It also imparts hardness to die-casting alloys. It has one peculiar property, which is that when freezing from the liquid state it expands like water, instead of contracting like most metals. This is a valuable property for alloys used in the manufacture of die-castings and hence it can be found in nearly all of them. From 1 to 2 per cent. seems to be sufficient, when acting in conjunction with the pressure under which the alloy is injected into the mold, to overcome the shrinkage imparted by the other metals.

Experiments have shown that pure antimony increases the expansion of pure lead in proportion to the percentage used until the maximum expansion is attained, when the antimony content reaches 13 per cent. This is the eutectic alloy and it melts at 443 deg. F. When more than 13 per cent. of antimony is used the expansion is lowered until it reaches a minimum at about 35 per cent. antimony. It then rises again to a second maximum with about 50 per cent. antimony, after which it again lowers and then rises until pure antimony is reached. It may seem queer that, while pure lead melts at 621 deg. F. and pure antimony at 1166 deg. F., a combination of the two will cause the melting temperature to lower to 443 deg. F. Many of the die-casting alloys given in the table, however, exhibit the same phenomena in melting temperatures; they being lower than the average melting temperature of the various ingredients.

Antimony gradually increases the hardness of lead until a content of 13 per cent. has been reached. From there to 17.3 per cent. of antimony a more gradual rise in hardness is made, and at this latter point the maximum hardness is attained. After 80 per cent. antimony has been passed the hardness again falls very rapidly down to that of the pure antimony. An alloy containing 32.5 per cent. of antimony and 76.5 per cent. of lead is four times as hard as pure lead.

Good sharp castings, in which the details are brought out plainly, are obtained when the alloys contain from 15 to 25 per cent. of antimony, as the expansion then produced causes the metal to completely fill the mold. With an alloy containing about 20 per cent. of antimony very good casting properties are obtained with a high degree of hardness.

While bismuth has this same property, it costs nearly 25 times as much as antimony and it is thus seldom used in die-castings. Bismuth, however, melts at 520 deg. F. and this gives it an advantage over antimony in some places. Bismuth expands to a greater degree than antimony on passing from the liquid to the solid state, and this also gives it an advantage where cost is not a factor. The desired results, however, can nearly always be obtained with antimony.

Aluminum

Small percentages of aluminum are used in nearly all of the high grade die-casting alloys. This usually ranges from 0.5 per cent. to 6 per cent. In this range it is used for its strength-giving as well as its purifying qualities. While copper is used in the alloys with a zinc base to overcome their crystalline nature by backing up the zinc crystals, aluminum or tin or both are used to confer strength. Aluminum has proved to be the better of the two elements for this purpose. Tin adds a certain amount of ductility to the zinc-copper alloys, but they lack the stiffness and fluidity that is imparted by aluminum. By adding 3 per cent. of aluminum to an alloy containing about 10 per cent. copper and the remainder zinc, the strength of the metal will be increased five-fold. Antimony has proved to be of little benefit in this regard,

and manganese has proved to be detrimental, as it makes the metal run more sluggishly, without adding any beneficial properties. Phosphorus, on the other hand, has proved to increase the strength of the zinc alloys containing copper and aluminum, and the one in the table showing a phosphor-copper content of 4.5 per cent proved to be stronger than cast iron.

Some of the aluminum alloys, that is, those that have aluminum for the base, are being cast in die-casting machines, but it is necessary to use ingredients that will lower the melting point of aluminum, which is 1215 deg. F. The oxide of aluminum forms so quickly on its surface that this also creates difficulties that have to be overcome when die-casting it. A composition that is fairly high in zinc and contains enough copper to give it the required toughness can be successfully cast.

Silicon, Sodium, Calcium, Etc.

Owing to the fact that silicon affects brass in nearly the same manner as aluminum, and aluminum greatly improves the brass mixtures, some experiments were carried out to see if it would have a similar influence on the zinc-base alloys that contained small percentages of copper. It seemed to work differently on these alloys, however, as when as high as 11 per cent. of silico-copper was used, in place of the ordinary copper, the silicon seemed to have no effect, as it neither increased nor decreased the strength of the alloy. This was also the case even when aluminum was added to the mixture.

Sodium, like other alkaline impurities, offers no resistance to the destructive influences of the dampness of air. It has a bad effect on alloys with a low copper percentage, and together with all other alkaline impurities should be kept out of die-casting alloys. Its properties are very similar to those of potassium. At ordinary temperatures it is soft like wax and it is light enough to float on water, its melting point being 207 deg. F.

Calcium, however, produces such a feeble alkaline solution that it might act as a good deoxidizer, and, if more uses were found for it, its price could be made cheap enough for practical purposes. Unless it should show superiority to the many other deoxidizers on the market, however, it would find little use. It melts at 1480 deg. F.

Thallium is a very soft white metal that oxidizes quickly in moist air and melts at 575 deg. F. It is quite similar to lead, but is softer and heavier. It is seldom met with outside of the laboratory, but exists in nature in quantities sufficient to make it available should it prove useful. It seems to possess properties that would add some good qualities to the white metal alloys.

Tellurium belongs to the same chemical group as sulphur. It is silvery white, crystalizes easily and melts at 845 deg. F. It exhibits some properties that would warrant experiment with it as a substitute for zinc. It is quite a rare element, however, and unless it should prove better than zinc it could not be made practically successful.

Nickel, Titanium and Cadmium

Nickel has added such good properties to steel that it is continually being experimented with in the non-ferrous alloys. It alloys readily with aluminum and increases its elasticity. It has been used in small percentages in some of the die-casting alloys and has proved beneficial. Enough is known to warrant the assumption that when the proper combination with other metals is discovered nickel will prove to be a useful metal for an alloying material. Its melting temperature, however, of 2640 deg. F. is too high for it to be used in any but homeopathic doses.

Titanium is fast coming into use as a purifier and an alloying element, and this will doubtless add good properties to the die-casting alloys. It has a great affinity for oxygen and nitrogen and should be of especial benefit in removing these gases, when the best manner of using it is known. These gases have proved to be very injurious in die-casting alloys. When not more than 3 per cent. is used titanium has a good influence on aluminum, and with a 2 per cent. titanium content aluminum alloys show greatly improved resistances to tensile stresses. It has also been proved of special benefit to copper and brass and bronze mixtures and thus should be of special benefit to the zinc-copper-aluminum die-casting alloys.

Cadmium belongs to the same chemical group as zinc and is very similar to magnesium, but is not as common as either of these. It is harder than tin and has a very similar color. It is whiter and less crystalline than zinc. It melts at 610 deg. F. It should thus be of especial benefit to die-casting alloys, if it were obtainable and the proper combinations were discovered. Its price is around $1 per pound, but it should be produced as cheaply as aluminum if there was a sufficient demand for it. Zinc and cadmium enter into solution in all proportions and remain so at all temperatures. These show the extreme of metal's solubility and compare with the liquids alcohol and water.

The various elements used to increase the physical properties of die-casting alloys since the industry started with type or bearing metals have given good results. The hardness, tensile strength, toughness, wearing qualities, resistance to shocks and strains and frictional wear have been greatly increased. The alloys as yet, however, are altogether too weak for many purposes. Their increase in physical properties has been a gradual growth and has taken many years. More progress is an assured fact, as many more individuals are now interested in this field of activity than formerly and the growth is bound to be much more rapid. The elements being brought into use in metallurgy and the many new compositions that it is possible to form give the assurance that die-casting alloys will be greatly improved. When these have attained the strength of bronze castings there will be an immense field opened for their exploitation. This might revolutionize a part of the foundry industry; but when the strength of steel shall have been attained there will be a much more complete revolution. The improvements in the past few years would seem to warrant the writer in prophesying this for the future.

The World Trademark Treaties

The first published report of the results of the fourth conference of the International Union for the Protection of Industrial Property appears in the Daily Consular and Trade Reports for September 2, issued by the Bureau of Manufactures of the Department of Commerce and Labor, Washington, D. C. The original documents were in French, and translations were made in the United States Patent Office.

The conventions resulting from these international conferences are of vital interest to all firms and individuals concerned with patents, trademarks, designs, etc., and the proceedings of the fourth conference, held in Washington from May 15 to June 2, 1911, are specially important in view of the fact that more than 75 delegates, representing 40 nations, were in attendance. The three conventions, or arrangements, revised at Washington relate to the protection of industrial property, the international registration of trademarks, and the repression of false indications of production on merchandise. The Daily Consular and Trade Reports publishes the full text of these conventions, together with a complete list of the delegates of the adhering nations.

Illustrations of Mesta machines and views of the plant of the Mesta Machine Company, West Homestead, Pa., have been compiled in a 32-page booklet presented as a souvenir to participants in the Pittsburgh meeting of the American Society of Mechanical Engineers. Conspicuous among the pictures are a four-stage air compressor for 1000 lb. pressure, a 100,000-lb. steel gear wheel 24 ft. in diameter, a 24-ft. rope wheel with 20 grooves, finishing a 20-ft. steel gear molded on a Mesta molding machine, a motor-driven lever shear capable of cold-cutting steel bars 7 in. square and mill and blowing engines and steel plants installed by the company.

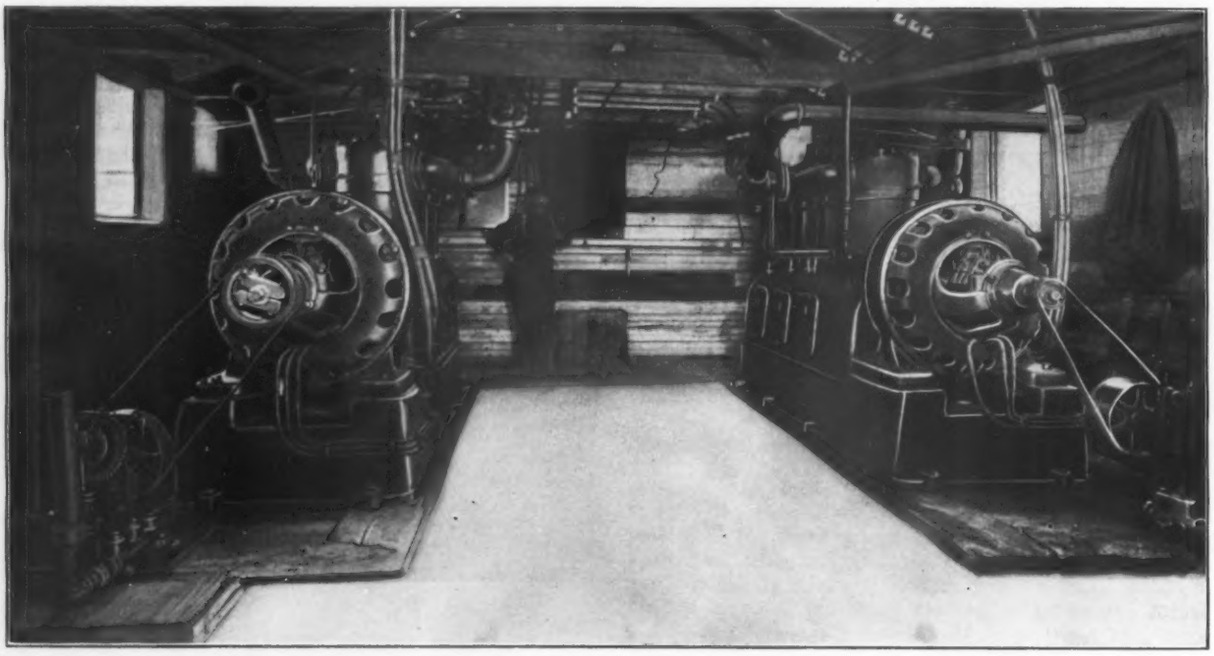
The Lorain Metal Products Company, Lorain, Ohio, was recently incorporated to take over the business conducted under the same name. Its chief product is iron castings, but in a short time brass molding will be added. The new company will continue to occupy the building heretofore used by the Lorain Metal Products Company, erecting additions thereto as needed. Martin S. Kelly is president; E. J. Maple, vice-president and superintendent; F. J. Stack, secretary and treasurer.

Notable Air Compressor Installation

Details of the National Motor-Driven Compressors Used at the Iroquois Steel Plant

An air compressor installation of more than usual interest was that employed by Hibben & Co., Chicago, Ill., in the construction of the new plant of the Iroquois Iron Company at South Chicago, Ill., which was illustrated in *The Iron Age*, July 6, 1911. Two of the special features of the installation are the controlling device which automatically maintains the pressure of the air supply within the maximum and the minimum limits and the particularly crude foundation upon which the compressors are mounted.

The two compressors are of the single-stage motor-driven 3VS type built by the National Brake & Electric Company, Milwaukee, Wis., the capacity of each unit being 300 cu. ft. of free air per minute. These compressors have been in service since January of this year, and furnished all the power required to operate the pneumatic tools and hoisting apparatus employed. In supplying compressed air for this kind of work an air compressor is subjected to very hard service, as the load changes constantly and the controlling device is of necessity required to operate with unusual frequency. In this case the controlling device was mounted on each compressor and permanently wired to the motor. Its function is to maintain the pressure of the air supply within predetermined limits by starting the compressor when the low-pressure limit is reached and stopping it when the pressure reaches the high point. Both of these operations are performed electrically, and as the compressor is started without load no undue strain is placed on any part of the apparatus. Its design is such as to limit the amount of current applied in starting to that required when running under normal full load conditions. If the supply voltage should chance to fail, the motor is not subjected to danger of the armature burning out, since the controlling device automatically inserts resistance in the circuit and simultaneously unloads the compressor. When current again flows through the line the controlling device starts the compressor in the normal way without manual assistance.



The Two Motor-Driven Air Compressors which Were Used in Constructing the New Plant of the Iroquois Iron Company. The Apparatus Was Made by the National Brake & Electric Company, Milwaukee, Wis.

Each unit was equipped with an individual direct-connected alternating current, three-phase, 60-cycle, 440-volt slip ring motor mounted on an extension of the lower half of the compressor frame. The arrangement of the apparatus is clearly shown in the accompanying engraving as well as the unstable foundations upon which the compressors were mounted. These consisted of 10 x 10 in. timbers with a few planks laid crossways and served to show the sturdy construction of the entire air compressor plant. The motor shaft is extended and a pulley from which the triplex water pump shown in the foreground is operated, is mounted thereon. This pump lifts the water direct from a well and circulates it through the system employed for cooling the compressor.

The main frame of the compressor is split in the horizontal plane and the two pieces are accurately machined and fitted. The lower half supports the crank shaft bearings and acts as an oil storage chamber as well while the upper portion is heavily ribbed, so as to give a maximum of strength to support the cylinders. Access to the crank chamber, crank shaft, connecting rods and other parts is readily provided by doors on the side. An outboard bearing is mounted within this upper half in which an extension of the pinion end of the armature shaft works. The gear and the pinion are of the herringbone type, the former being of open hearth steel and the latter of tool steel. The compressor cylinders are arranged vertically, thus affording a very compact form of installation and eliminating all uneven wear on the piston and the cylinder surfaces. The valves are made of nickel steel which reduces the wear and also the possibility of breaking to a minimum. All the working parts are entirely inclose to protect them from possible injury while they are at the same time readily accessible for inspection.

An automatic lubricating system serves the bearings and the other working parts and requires no attention other than an occasional replenishing of the oil supply. While the compressor is operating the oil which is stored in the lower half of the crank chamber is splashed over the crank shaft and the bearings. The gear is partly submerged in the oil in this chamber and during operation automatically lubricates itself and the pinion together with the outboard bearing. The wrist pin is lubricated automatically by a device consisting of a long slender tube with a steel ball valve at its lower end which is fastened to the connecting rod. In this way the oil is forced through the tube and on the wrist pin by the action of the connecting rod.

In addition to supplying compressed air for the work of Hibben & Co., these compressors also supplied compressed air to the American Bridge Company and the Brown Hoist Company for operating the pneumatic tools employed by these firms in erecting their part of the work. The service rendered throughout was uniformly reliable, entirely satisfactory and very economical, and at no time was it necessary to resort to steam-driven appliances. In this way it was possible for the contractors to dispense with the services of a licensed steam engineer which resulted in conducting the operations not only expeditiously but also advantageously and economically. The saving to

the firm due to the use of motor-driven compressors instead of steam and belt-driven compressors and steam-driven hoisting engines was estimated at approximately $18 per day.

The American Locomotive Company

Tenth Annual Report

The American Locomotive Company has issued its report for the year ended June 30, 1911. Following is a summary of its operations, including the Montreal Locomotive Works, Ltd., as compared with the preceding fiscal year:

	1910-11.	1909-10.	Increase.
Gross earnings	$40,649,385.08	$32,203,392.10	$8,445,992.98
Manufacturing, maintenance and administrative expenses and depreciation	36,526,514.79	29,605,443.09	6,921,071.70
Net earnings	$4,122,870.29	$2,597,949.01	$1,524,921.28
Interest, etc., on bonds of constituent companies, coupon notes, etc.	557,308.53	513,190.69	44,117.84
Profit	$3,565,561.76	$2,084,758.32	$1,480,803.44
Dividends on preferred stock at 7 per cent	1,750,000.00	1,750,000.00	.....
Surplus	$1,815,561.76	$334,758.32	$1,480,803.44
Extraordinary additions and betterment fund	300,000.00	.....	300,000.00
Net credit to profit and loss	$1,515,561.76	$334,758.32	$1,180,803.44

The condensed general balance sheet, of the same companies, as of June 30, 1911, is as follows:

Assets.	
Cost of property	$52,982,737.50
Securities owned	781,757.12
Cash	2,865,850.97
Accounts collectible	6,860,437.23
Bills receivable	993,342.95
Accrued interest	4,744.14
Material and supplies	5,282,728.50
Contract work in course of construction	740,549.91
Steam shovels, contractors' locomotives and automobiles manufactured for stock	925,360.20
Notes discounted (per contra)	2,143,554.46
Total	$73,581,062.98
Liabilities.	
Preferred stock	$25,000,000.00
Common stock	25,000,000.00
Bonded debt of constituent companies:	
Richmond Locomotive Works	$550,000.00
Dickson Mfg. Company	562,500.00
Rogers Locomotive Works	280,000.00
Montreal Locomotive Works	1,500,000.00
Gold coupon notes	$6,000,000.00
Accounts payable	1,852,068.65
Accrued interest	110,270.82
Unclaimed interest	1,025.00
Dividends on preferred stock payable July 21, 1911	437,500.00
Indorsements (per contra)	2,143,554.46
Extraordinary additions and betterment fund	587,472.88
Profit and loss:	
Balance June 30, 1910	$8,041,109.41
Add profit for 1910-11	1,515,561.76
Total	$73,581,062.98

The following extracts are taken from the accompanying statement by President W. H. Marshall:

The gross earnings for the year, $40,649,385, were $8,445,993 greater than the preceding year and over twice as large as the year 1908-9.

Production varied during the year from a maximum of 80 per cent. of the capacity of the plants to a minimum of 38 per cent.

At the beginning of the year there were unfilled orders on the books of $17,550,000, nearly one-half of the gross earnings for the year, and on July 1, 1911, the amount was $6,015,000. In only one month during the year did the receipt of orders represent work for more than one-half of the company's capacity, and it was evident early in the winter that retrenchment was necessary to meet the falling off in business which overtook the plants during the last half of the year. Several of the smaller plants were therefore closed and the orders confined to the larger plants, with the resultant economy in the cost of plant operations as a whole.

Reference was made in a preceding report to extensive improvements at the larger plants which are located at Schenectady, Dunkirk, Pittsburgh and Richmond. These improvements have been practically completed, the capacity of the company being now twice as great as it was at the time of its formation in 1901, and capable of producing about $60,000,000 of business.

In addition to expenditures above referred to, the company has spent on its plants during the year for miscellaneous betterments $402,315.59 of the "extraordinary additions and betterment fund." From the surplus earnings of the year, there has been set aside a sum of $300,000 for "extraordinary additions and betterments," making the total amount of this fund available for further expenditures $587,472.88.

During the last 10 years the company has persistently adhered to the policy of maintaining its plants in the highest state of efficiency and has expended for maintenance and upkeep, including minor betterments involved in the re-designing of machinery, equipment, etc., $11,256,787, all of which has been charged against income as a part of current expenses.

On October 1, 1911, there will be paid the fifth and last installment of $1,000,000 of short term gold coupon notes which were issued October 1, 1906, leaving a balance of outstanding notes of $5,000,000 which were issued October 1, 1909.

The balance sheet includes a charge of $2,143,554.46 representing equipment trust notes discounted by this company in advance of maturity, and, as there is a possible obligation, in the event of any default in payment, a like amount is also shown as a contingent liability. The notes are secured by a lien upon the locomotives and the security is ample. There has been a decrease in this account since last year of $290,029.79.

The name of the Dickson Works at Scranton, Pa., is omitted from the list of plants operated by the company. During the year this plant was closed and dismantled, a contract entered into for the sale of the real estate, and arrangements made to retire during the ensuing year the bonds outstanding against that property, amounting to $562,500.

Titaniferous Iron Sands.—A pamphlet is being distributed in this country bearing the name of an exploiting company at The Hague, Holland, and entitled "Titaniferous Iron Sand in the Island of Java." It purports to give, amid a jumble of comment on ore reduction and other metallurgical phenomena, some data on the electric smelting of titaniferous iron sands and the subsequent treatment of the product in making steel in the electric furnace. The author has interluded his scientific observations with weak attempts at wit, making it much of a question how far his rambling paragraphs will be taken seriously. A quotation is made, purporting to be from an opinion of "the editor of *The Iron Age*" on "a new process for producing pure iron direct from iron ores," but no such statement was ever made by any one connected with this paper, editorially or otherwise. A similar statement, credited to the same source, was circulated some time ago in support of a so-called "direct process" whose promoters have been driven from the field of their stock-selling operations. So far as the electric furnace is concerned it has well earned its place in modern steel making, but it is a doubtful policy to attempt to create interest in it by such rubbish as this Hague pamphlet.

Representative A. O. Stanley, chairman of the Congressional committee which is investigating the United States Steel Corporation, visited Gary, Ind., last week in company with R. A. Woolley, who is known as the field investigator of the committee. The homes of workmen, the public schools, the recreation facilities and other institutions were inspected and the mills were visited. Chairman Stanley also visited Duluth and made inquiry concerning the operations of the ore railroads of the Steel Corporation.

The Standard Welding Company will open a branch office in the Ford Building, Detroit, September 11, in charge of C. E. Miller.

The Goulds Mfg. Company, Seneca Falls, N. Y., is among the large employers of labor who realize the value of cementing their organization more closely by getting all the employees together socially at certain periods. On August 23 the employees of this company had an outing at Cayuga Lake Park, near Seneca Falls, which proved highly successful. An account of the athletic events on this occasion was given large space on the sporting pages of the daily papers of Rochester, Auburn and Syracuse.

Coke Oven Gas as an Open Hearth Fuel

Its Use a Logical Development of the Extension of the By-Product System—Features of the Practice at Sydney, Nova Scotia, and in Europe

BY ARTHUR P. SCOTT[1]

Characteristic of more or less recent metallurgical literature has been an increasing interest in the disposition of by-product coke-oven gas, more especially with reference to its possibilities as a fuel in the open-hearth furnace. In this connection four articles, which seem to be of special importance, will be briefly abstracted by way of introduction to a short discussion of the subject. The first of these, "On the Present-Day Status of Basic Open-Hearth Practice," which is to be found in Nos. 1 and 2 of Stahl und Eisen for 1910, was read by Dr. Otto Petersen before the Verein Deutscher Eisenhüttenleute on December 5, 1909, in Düsseldorf. In describing the Hubertushütte open-hearth plant in Kattowitz, O. S., Dr. Petersen says in substance:

Results at Hubertushütte

The steel works consist of two 20-ton and one 25-ton basic open-hearth furnaces, the capacity of whose regenerators amounts to about 1.4 cu. m. per ton in the gas chambers and 1.6 cu. m. in the air chambers. The gas producer plant consists partly of old Siemens producers and partly of modern water-sealed producers. This open-hearth plant has been using coke-oven gas as fuel since June, 1907. The quantity of oven gas used was small at first, but was gradually increased until, taking the coal consumption at Hubertushütte for 1906 as normal under producer practice at 31.8 per cent. in September, 1909, with an ingot production of 6200 tons, the coal consumption amounted to only 14.9 per cent., so that 53.15 per cent. of the total coal requirements was replaced by oven gas. The above fuel consumption includes, besides the open-hearth furnaces, provisions for such allied requirements as test and hardening forges, ladle warming and a 6-ton acid open hearth in the steel foundry with its annealing and core ovens. Oven gas is in regular use at Hubertushütte, and the full complement of producers is only requisitioned to make good an occasional shortage. The life of the open hearth ends and roof has been reduced by about 8 to 10 per cent. (being now 550 to 600 heats), while the life of the checkers has been increased 40 to 60 per cent. (now 1050 heats). For this reason, along with the saving in coal, unloading wages, producer labor and maintenance, this departure in open-hearth practice appears to be of considerable economic importance.

Experience at Sydney, Nova Scotia

In the discussion following Dr. Petersen's address, E. von Maltitz, of Barmen, said in part: "Some years ago I had to run three of the open-hearth furnaces on coke-oven gas exclusively at the works of the Dominion Iron & Steel Company, at Sydney, C. B., Canada. It was not possible to preheat the oven gas in the regenerators without considerable loss of CO and a corresponding increase of CO_2. We were compelled, therefore, to use the gas without regeneration and we followed the method employed in the Pittsburgh district for natural gas; that is, the gas was fed into the furnace through 6-in. pipes inserted close to the hearth on both sides of the ports. The heat obtained from this gas was so small that we were compelled to supplement it with tar from the coke-oven plant. As a result of the use of tar the life of the roof was reduced to 90 heats. We were obliged after three years of fruitless effort to give up the use of coke-oven gas with tar. For this reason it would interest me very much if Director Amende, of Hubertushütte, gave a few details concerning his methods, whereby not only is the time of heat cut down, but the life of the roof, considering the fuel employed, is so unusually high.'"

Director Amende in replying gave no information as to the method of introduction of the gas, merely adding the following facts: The coke-oven plant at Hubertushütte consists of 90 Otto-Hoffman ovens, 10 m. long, 1.5 m. high and 0.55 m. wide. This plant handles 320 tons of coal in 24 hours, and the oven gas has the following composition:

	Per cent.
CO_2	6.5
C_2H_2	2.0
O	1.2
CH_4	16.4
H	38.7
N	24.8
CO	10.4

The coal employed is of poor quality and 50 to 60 per cent. or even 70 per cent. of the gas is used for heating the ovens themselves. In general the excess gas amounts to 45 per cent.—in all about 50,000 to 70,000 cu. m. in 24 hours. There has been no deleterious effect upon the open-hearth product, which consists of shapes and bars, also sheets and band iron of the finest grade. In every respect the use of coke-oven gas has proved satisfactory and he would gladly use more of it if he had it to use.

The Fields for Blast Furnace and Coke Oven Gas

The second article in question is a paper[2] read before the Fifth International Congress for Mining, Metallurgy, Applied Mechanics and Practical Geology at Düsseldorf in June, 1910, by Chief Engineer Terpitz, who describes the use of oven gas as an open-hearth fuel at Hubertushütte, but adds nothing to the data given by Dr. Petersen and Director Amende. He calls attention, however, to the large additional surplus of tunnelhead gas that has become available by reason of the development of the gas engine, and emphasizes the increasing importance of studying the peculiar adaptability of blast-furnace gas and coke-oven gas, respectively, that each may be employed to the best economic advantage. He describes certain attempts to utilize blast-furnace gas as an open-hearth fuel, and, though results to date have not been definitely encouraging, he believes that in a few years blast-furnace gas will be successfully used in that capacity, although it will probably have to be regenerated by passing it through hot coke or coal. He adds, however, that in view of the ease with which low-grade dust coal may be used under boilers and of the fact that blast-furnace gas is distinctly more suitable for gas engine consumption than is oven gas, the logical outlet for the latter is through the open-hearth furnace, for use in which, as has been fully demonstrated at Hubertushütte, it is pre-eminently well adapted.

Oven Gas at the Cockerill Steel Foundry

The third article, which is a communication made to the alumni of the Liege Engineering School on May 1, 1910, by Charles Wigny, chief engineer of the Cockerill Company, and published in the Revue Universelle des Mines for August, 1910, describes the use of oven gas in a 4-ton, open-hearth furnace in the Cockerill foundry. This article was reviewed from the German in *The Iron Age* of February 2, 1911, p. 318, but has lost so much in the double translation that it will be well worth the reader's while to refer to the original. A few of the main facts are here recapitulated. The furnace in question manufactures soft steel for the foundry, making with producer gas 3½ heats in 24 hours from a charge of 30 per cent. pig iron, 35 per cent. steel scrap and 35 per cent. steel turnings, with a yield of 95 per cent. It is of special design, the hearth, gas producers and regenerative chambers for the air constituting one solid block of masonry. The gas is not preheated, but arrives from the producer with practically all of its sensible heat and without losing any tar or carbon. The fuel consumption under producer practice is 40 per cent., which, in view of the small capacity of the furnace, seems excellent. The use of oven gas as a fuel was begun without any change in the charge or in the furnace design, the oven gas was led directly into the

[1] Metallurgist, Allegheny Steel Company, Brackenridge, Pa.

[2] Reviewed in *The Iron Age* July 14, 1910, page 103.

main of the two producers, it having been the original intention to mix oven and producer gases. This was found unnecessary, however, and for almost a year previous to the date of writing not a single kilogram of coal had been charged. The oven-gas consumption per ton of steel was 435 cu. m., the daily production being raised from 14 to 16 tons in 24 hours. The oven gas had the composition:

H	57 per cent.
CO_2	1.5 per cent.
CO	6.0 per cent.
CH_4	22.5 per cent.
Nitrogen	13.0 per cent.
Calorific power (Net)	3640 calories per M^3

Mr. Wigny then proceeds to show by calculation that oven gas is actually a more efficient fuel in the open hearth than is producer gas; that it is better economy to employ oven gas in the open hearth than to use it for the production of power with either a steam engine or turbine or a gas motor; and that with even a relatively poor oven gas the flame temperature amply suffices for steel melting. On the other hand he points out that blast-furnace gas at the best produces a flame temperature that is very near the low line as far as open-hearth requirements are concerned, and that a poor blast-furnace gas, even with air and gas both preheated to 900 deg., is quite inadequate.

The Higher Efficiency of Coke Oven Gas

The fourth and last paper referred to is by M. Trasenster in the Revue Universelle des Mines, November, 1910. This article has been reviewed from the German in *The Iron Age* for May 18, 1911, p. 1232; but, as C. C. Tufts very justly observes (*The Iron Age* for June 22, 1911, p. 1501), this article also has suffered in the double translation.

Trasenster's contribution is best read as a sequel to Wigny. He states that the very favorable results described by Wigny for the 4-ton furnace in the Cockerill steel foundry have been confirmed by a like experience with the 7-ton open-hearth furnace in the same foundry, and on the basis of some very interesting calculations explains why coke-oven gas shows higher thermal efficiency in the steel furnace than producer gas and that although under some conditions the efficiency of oven gas in the gas engine may be greater than its efficiency as an open-hearth fuel, nevertheless the greater cost of producer coal as compared with the poorer grades that may be employed for steam raising may probably even then swing the actual balance of economy in favor of burning coke-oven gas in the open-hearth furnace.

The Results Summarized

The gist of the evidence to date appears, therefore, to be:

1. That as regards steel works consumption, the most economical disposition of the surplus gas of the by-product coke oven is as an open-hearth fuel—a disposition which has been shown to be perfectly practical for the gas, either alone or mixed with producer gas.

2. That the furnace tonnage is thereby not diminished, but rather increased and the furnace life is not materially impaired. Recorded experience in this direction seems to be confined to Kattowitz and Seraing. It is unfortunate that the method employed at Hubertushütte for introducing the oven gas into the furnace has not been described, but the writer is informed[5] that mixture of the two gases is regarded as essential from the point of view of safety, the producer gas being lighted first and the oven gas introduced subsequently into the current of producer gas. At what point the introduction is effected is not stated.

Against these two successes must be scored the failure recorded by Herr von Maltitz at the works of the Dominion Iron & Steel Company, at Sydney, and as the writer has some knowledge of the manner in which the experiments at the latter place were carried on, a few notes regarding them may be of interest. The facts are as recorded by Herr von Maltitz, but other facts which seem to the writer to have a very important bearing on the case have been omitted.

Further Data on Sydney Practice

In the first place, while it is true that natural gas is ordinarily introduced at both sides of the ports, it is also true that the Pittsburgh furnace in vogue with this gas is characterized by its use of the open port with both chambers on air, which is distinctly different from the type of end employed in other districts for use with producer gas; and more especially does it differ from the type of end necessitated by the usual form of the Campbell type of tilting open-hearth furnace. It is a perfectly safe assumption that the furnace end in which it was attempted at Sydney to burn oven gas would not have proved successful with even natural gas, which is well known to be an almost ideal open-hearth fuel. The complaint was made by the Sydney melters that the oven gas "flew high to the roof"—which was true; but this manifestation was wrongly blamed upon the relatively high hydrogen content of oven gas. As will be shown later herein, the Sydney gas is of excellent quality. As a matter of fact, whenever we find the flame in an open-hearth furnace curling about the roof brick instead of sweeping rapidly over the bath, we may conclude with certainty, not that aught is amiss with the fuel, but that there is a pinch in the draft somewhere. Natural gas in a poorly drawing furnace will hug the roof just as closely as the oven gas ever did at Sydney. The same principle holds *a fortiori* when the congestion is aggravated by the introduction of a bountiful supply of steam-blown tar. The premature destruction of the roof recorded by Herr von Maltitz is simply an indication that a good fuel was misapplied. The writer firmly believes that under the same conditions fuel oil would have made an equally poor showing. Finally, the employment of coke-oven gas as a fuel at Sydney was only one of several very formidable metallurgical problems that confronted the management there at the outset and it was considered inexpedient at that juncture unnecessarily to complicate the situation by experimenting further with oven gas, but the ingenuity of Herr von Maltitz and of his associates had by no means been taxed to the utmost in this regard when the use of coke-oven gas was abandoned.[4]

A Comparison of Gases at Belgian and German Works

The following tables of analyses and of calorific values based thereon are for the Cockerill and Hubertushütte fuels:

Analyses.

	Cockerill prod. gas.	Cockerill oven gas.	Typical Oberschlesien prod. gas.[6]	Hubertushütte oven gas.
CO_2	7.5	1.5	2.8	6.5
O_2	..	..	..	1.2
C_2H_4	..	..	..	2.0
CO	19.3	6.0	30.2	10.4
H_2	12.3	57.0	14.1	38.7
CH_4	1.3	22.5	..	16.4
N_2	59.6	13.0	52.9	24.8

Calorific Values.

	Net cal. per M^3.	Air req'd per M^3.	Products of comb. per M^3.	Equiv. vol.	Air Reqd.	Total gas and air.	Total waste gases.
Cockerill producer gas	1024	.885	1.727	3.523	3.118	6.641	6.084
Cockerill oven gas	[6] 3608	3.678	4.363	1.000	3.678	4.678	4.363
An Oberschl. prod. gas	1293	1.067	1.845	2.343	2.500	4.843	4.323
Hubertushütte oven gas	[7] 3029	2.986	3.741	1.000	2.986	3.986	3.741

The tables clearly show that while the products of combustion of oven gas are less voluminous than those of

[4] It is safe to say that if the management of the Dominion Iron & Steel Company had considered itself warranted by general economic considerations in resuming the attempt to utilize oven gas in this manner it would have done so without hesitation, because there is not, to the writer's knowledge, on this side of the Atlantic a single steel works where the utilization of the by-product is more carefully and effectually studied than is done at Sydney. For instance, the high phosphorus content of Dominion iron, which at first seemed a serious menace to production, has been turned to very material account, the procedure being to blow the molten pig in a basic vessel to low phosphorus and then to transfer to a basic open-hearth furnace, where, by mixing four or five pots of basic blown metal with perhaps one pot of molten pig, a 50-ton heat is finished in a very short space of time after the last pot has been blown, the "reboil" with molten pig counteracting entirely any superoxidation that may result from the after blow. In this manner during a recent month Dominion made nearly 12,000 tons of ingots from one 50-ton furnace, which must be conceded to be a remarkable performance. Under such circumstances, of course, fuel cost almost vanishes. The economy of the process has more recently been added to by marketing the basic slag as a fertilizer. The only other plant where this basic duplex process has been operated, so far as the writer is aware, is that of the Phoenix Company, at Hörde, Westphalia.

[5] Private communication.

[6] Wigny's value is 3640 calories.

[7] Amende's value, presumably allowing for benzol, etc., 3300 calories.

producer gas, they are, nevertheless, considerably more bulky than either an equivalent of producer gas or the air required to burn it. Wigny's furnace does not preheat the gas; therefore the air downtakes must be ample to accommodate freely all the products of combustion and insure proper draft. The Hubertushütte furnace, on the other hand, being of the usual producer-gas type, must needs keep both air and gas downtakes in commission, in order to insure good working draft. This has been effected in one of the two practical ways; viz, by keeping gas and air distinct and throwing the rich gas into a carrying medium of lean gas. The other way is to merge gas and air ports and utilize the whole regenerative system for air, introducing the rich gas cold at the neck of the furnace, as is done in the Pittsburgh district with natural gas and which is in principle the method followed in the 4-ton furnace at Seraing.

How Far Coke Oven Gas Can Be Depended on for Steel Works Supply

There is no reasonable doubt that scrubbed by-product, coke-oven gas of average quality can be substituted for natural gas and successfully burned unmixed with any other gas in the present Homestead type of open-hearth furnace without detriment either to furnace or to production, though there would be anticipated, other things being equal, a certain increase in the sulphur content of the product, dependent upon the character of the coking coal used. Nor can we doubt that with the same general type of furnace, successfully burning fuel oil, a tar tank could be coupled to the oil pumps, due regard being had to the fluidity of the tar, without prejudice either to the furnace or to production. Admitting this to be so, let us see to what extent in a self-contained steel plant, the by-product coke oven installation may be depended upon for open-hearth fuel.

Let our blast-furnace plant, with a fuel ratio of 2000 lb., deliver 1000 tons of molten basic iron per day to our mixers. Let us use exclusively our own scrap which we shall suppose amounts to 20 per cent. Let our open hearth yield (ore not reckoned) be 98 per cent and let our fuel consumption be 8000[8] cu. ft. of natural gas per ton of steel. Let our natural gas have the following composition and calorific value:

Carbon dioxide	0.0
Ogygen	0.2
Ethylene	2.2
Carbon monoxide	0.3
Hydrogen	3.0
Methane	91.8
Nitrogen	2.5
Net calorific value calculated	8298 calories per cu. m.
Volumes of air required to burn one volume of gas	9.13

Let our coke-oven gas have the following composition and calorific value:[9]

Carbon dioxide	3.2
Oxygen	0.4
Ethylene	2.8
Carbon monoxide	6.3
Hydrogen	41.6
Methane	29.6
Nitrogen	16.1
Net calorific value (calculated)	4240 calories per cu. m.
Volumes of air required to burn one volume of gas	4.43

We can, therefore, figure roughly on an oven-gas consumption of 16,000 cu. ft. per ton of steel.[10]

The following is fairly typical of the charge and yield of a well-known type of by-product oven with a good average gas coal:

Charge:
5.65 gross tons of coal

Yield:
Coke ..... 4.43 net tons
Tar ..... 57 U. S. gallons
Surplus gas ..... 22,600 cu ft.[11]

[8] This is a most liberal allowance. Under standard conditions this figure should be well under 7000 cu. ft per ton for basic furnaces.

[9] The figures here given represent a typical analysis of the Sydney gas, and are taken from trustworthy notes in the writer's possession. This gas has at times been poorer, but was practically always at least of the excellence recorded for the Hubertushütte gas.

[10] This estimate is somewhat higher than the consumption given above for Wigny's 4-ton furnace. He reports the equivalent of 15,355 cu. ft for a gas with a net calorific power of only 3640 calories, which, in view of the coal consumption of 40 per cent. reported by him for the same furnace under producer practice, shows our forecast to be conservative in the extreme. Our estimate also takes no account of suspended tar and benzol, which quite appreciably enhance the actual heating value of oven gas.

On this basis we figure from our 1000 net tons daily of coke a surplus of 5,100,000 cu. ft., or enough, none being diverted to other uses, to take care of 320 tons of steel daily; that is, about 25 per cent. of our ingot production, which we may calculate as 1219 tons. With a higher fuel ratio at the blast furnaces we should, of course, have a correspondingly larger surplus of gas.

In addition to this gas surplus we have also $\frac{1000 \times 57}{4.43} =$ 12,867 gal. of tar as a by-product from our daily quantum of coke. Figures on the calorific value of coal tar are by no means plentiful, but from an abstract of an address by President Godinet, of the Société Technique du Gaz en France, and which appears in the Journal of Gas Lighting, Water Suppy, etc., July 13, 1909, p. 99, we select a heating value of 8000 calories, that being the lowest of the several values there given. The highest value quoted by M. Godinet is 11,000 calories and some authors give 10,500 as a representative value. Using 8000 calories and a specific gravity of 1.18, we calculate calories per gallons of tar as 35,736, virtually the same value as 35,961 per gallon of fuel oil of the usual 10,555 calories and specific gravity 0.900. Assuming like thermal efficiency in the furnace for both tar and oil, we find ourselves enabled with 12,867 gal. daily of tar to provide for the production of a further 250 tons of steel, on the basis of 50 gal. of fuel oil per ton of basic open-hearth steel—a reasonably liberal allowance.

We have thus substituted gas and tar for 47 per cent. of our fuel consumption. In other words, figuring the coal consumption under producer practice as 700 lb. per ton, we effect a daily saving of about 180 tons of coal, which represents an absolute return of 14 per cent. of the coal required to produce our daily coke supply, besides a certain small reduction in producer maintenance and wages; also, the life of the furnace should not be appreciably affected. When a melter states that fuel A is harder on the furnace than fuel B, he is simply unconsciously stating that he and his bricklayer have been accustomed to fuel B and favor furnace lines that suffer under fuel A. A melter accustomed to fuel A will aver contrariwise, and so on. If the Hubertushütte regenerators are situated immediately beneath the furnace and lack slag pockets; if the producer coal is relatively high in ash and the producers are fairly close to the furnace—all of which things are probable—the increase of checker life with oven gas, as recorded by Director Amende, is readily understood. Under normal conditions, however, the character, both physical and chemical, of the stock employed, has more to do with furnace life than has the fuel.

Objections to By-Product Gas

There are two objections that may be urged against the use of by-product gas:

1. A shop that depends upon tonnage for its livelihood must standardize in every possible way, and in the long run, other things being equal, an open-hearth mill burning the same fuel all along the line, has the advantage of the mill which burns three fuels.

2. Not least among the advantages of a producer fired furnace is its absolute independence of every other part of the world, as far as fuel is concerned, except the coal yard. The furnace fired with oven gas or tar introduces an additional peradventure. If the normal fuel for the mill be natural gas or oil, this objection is negligible, since in the light of the above ventured opinions natural gas, fuel oil, oven gas and coal tar can be burned interchangeably in the open-port type of furnace. If the normal fuel, however, be producer gas, two types of furnace are necessary; and in case of absolute failure of oven-gas supply, the open-port type will require at the very least one week's time to change it over to the producer-gas pattern. On the other hand, of course, such failure of oven gas can be met by the use of stored tar for a time, or by fuel oil. A comparison of the reigning prices for tar and fuel oil, respectively, will be found to be very instructive in this connection, more especially in view of the probability that the former price will not rise and that the latter will not drop, at least in the near future.

[11] The figures given by Director Amende of Hubertushütte are equivalent to approximately 37,400 cu. ft. of surplus gas for the same oven charge. His figures seem to indicate a 36-hour coke.

Let it be said, in conclusion, that by-product recovery as applied to the manufacture of blast-furnace coke is logical and attractive; but it should be realized at the outset that the by-product coke oven must be strictly immune from "tonnage fever", which is another way of stating that its operating costs, other things being equal, cannot be materially depressed below a certain normal for any one set of conditions. Its high first cost must, therefore, be compensated for solely by increased percentage of coke yield, and by scrupulous economy of the by-products. Of the latter, ammonia is usually well taken care of; but not so, for the most part, the gas and tar, the all too frequent tendency being to seize every possible pretext for burning or otherwise disposing of them with some faint show of economy rather than to systematically husband them. Ladle warming, for instance, is a convenient scape goat.[12] These things should not be. It is only one degree less reprehensible to install a recovery system and fritter away a substantial portion of the by-product, than it is to build the older type of oven and frankly waste the whole of it. How, then, may by-product tar and gas be disposed of? Heat, light and power production and the chemical industries furnish only a partial answer. Do not the signs seem to point significantly in the direction of the open-hearth furnace?

[12]Ladle warming, it may be added, is one of the most gratuitously wasteful and poorly performed operations in steel works practice today. The quantity of fuel of one kind or another that is employed in very many works to produce a miserable apology for a hot ladle is nothing short of scandalous. One of the few creditable practices in this direction was observed by the writer in a certain European works, where the ladle, of approximately fifteen tons capacity, was simply inverted over a small steam-blown fire of refuse coke, acquiring thereby a good and even heat with negligible fuel cost. Larger ladles, perhaps, scarcely lend themselves to this method.

A New Browning Crane

Details of the Electric Locomotive Type for Handling Coal

Handling coal for electric railway power houses is the special field covered by a new crane recently brought out by the Browning Engineering Company, Cleveland, Ohio. It is of the locomotive type with motor drive. In addition to handling fuel for power houses it can also be used on docks, as is clearly shown in the accompanying engravings, which are reproduced from photographs taken

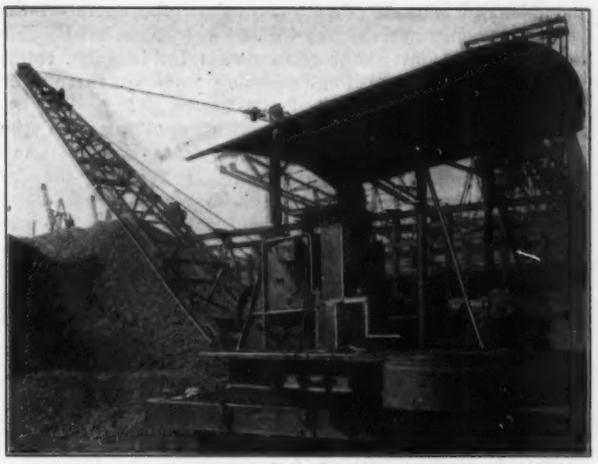


Fig. 1.—The New Electric Locomotive Crane Built by the Browning Engineering Company, Cleveland, Ohio.

at the plant of the Wisconsin Coal & Dock Company, Milwaukee, Wis. A general view of the crane is given in Fig. 1, while Fig. 2 shows the machine loading cars from a stock pile.

In general the construction of the crane is practically the same as that of the builder's steam locomotive crane, the only change being that a 50-hp. motor and the necessary controlling devices are substituted for the boiler, the engine and the water tank which form a part of the equipment of the steam-operated machine. Power is ordinarily taken from an overhead wire through a trolley pole, the wire being fed from a direct-current generator or an adjacent distributing transformer. In the crane in use at Milwaukee the current is brought to the machine by a jumper feed wire terminating in a plug, which is inserted in a socket just below the deck of the crane. The current, regardless of its source of supply, is led to a shoe on the lower base which makes a rubbing contact with a collector ring on the upper or swiveling base. The wiring is entirely inclosed in metal and fiber conduits which protect it from moisture and mechanical injury. A 50-hp. 500-volt Westinghouse direct-current motor of the No. 306 Inter-pole railway type is used, which is capable of developing a high torque. The motor is re-

Fig. 2—The Crane Loading Cars From a Stock Pile.

versible and is under direct control of the operator, the controller being conveniently located in front of his regular position. The one motor can be used for hoisting, rotating, slewing and traveling, and any three of these four operations can be performed simultaneously.

The crane is fitted with a 38-ft. steel beam of the builder's standard design and double drums for operating a two-line automatic grab bucket. The capacity of the bucket is 1 cu. yd. or 4000 lb. and the maximum radius of the boom is 35 ft. The capacity of the crane is 500 tons per 10-hr. day. The crane is mounted on a four-wheel truck and travels at a speed of 600 ft. per minute. All of the gears used are made from open-hearth steel forgings and have cut teeth, no cast gears or pinions being used.

Annealing Steel Castings*

Suggestions on Proper Procedure in the Foundry

BY BRADLEY STOUGHTON

The annealing of steel castings is not always a necessary operation in their manufacture, and especially in the manufacture of small steel castings, which have not great length to produce severe strains by shrinkage. While it cannot be denied that proper annealing must benefit all steel castings in greater or less degree, on the other hand, annealing, as too frequently practiced, is often more a detriment to some castings in the heat than it is a benefit to the remainder.

Annealing has the two-fold purpose of relieving any strains produced in the metal during cooling in the mold, and of improving the strength and ductility of the metal by breaking up the coarse structure inevitably developed to some extent during cooling from solidification and, in some cases, amounting to that extreme degree of coarse crystallization which causes the appearance known as ingotism. Annealing to relieve strains is a comparatively simple operation, but annealing to produce the best grain obtainable, which shall in turn give the highest possible combination of strength and ductility to the casting, is an operation so often imperfectly understood and crudely practiced in foundries, that I hope an interchange of ideas may be of benefit, even though I cannot offer anything new or revolutionary for consideration.

Microscope and Pyrometer in Annealing Work

The microscope and some form of pyrometer, however crude, are invaluable adjuncts to annealing practice. The time has passed when steel foundries can obtain the best results in competition by means of the unaided eye. The pyrometer will tell us when the steel has reached that temperature which will give to it the best grain, and, therefore, the best physical properties, while the microscope will tell us whether or not this heat treatment has performed its work as thoroughly as it should. If the structure of the casting, after its first solidification is not excessively coarse, heating it slightly above its critical temperature, maintaining it there until the heat has penetrated to the most remote point, and then for about one-half hour thereafter will produce the desired result. But, if the steel has been cast at an excessively high temperature, or if it cooled with unusual slowness through the first 200 or 300 deg. after solidification, or if, in any other way, an unusual coarse and open crystalline structure has been produced, the process of annealing described above, even if protracted beyond the time limits mentioned there, will not completely obliterate the coarse crystals. The large crystals will be broken up into smaller ones, it is true; nevertheless, a sort of skeleton work, showing indistinctly the boundaries of the previous large size crystals will persist, and the steel will be somewhat below normal in strength and ductility, or both.

This point will be well seen by reference to Figs. 1, 2 and 3. Fig. 1 shows fine-grained steel as produced by forging or rolling; Fig. 2 shows the same steel in a very coarse crystalline state; while Fig. 3 shows the same steel after again reheating above its critical temperature. It will be seen that the large crystals are broken up into small ones, but there still persists a skeleton work showing the outline of some of the coarse grains.

Figs. 4, 5 and 6, on the other hand, show steel in a finely grained condition; the same steel with a coarse structure, and, finally, this coarse structure refined almost to its original condition.

Double Process in Annealing

In order that the steel shown in Fig. 3 might be refined as completely as that shown in Fig. 6, two steps in the annealing would be necessary. The coarse-grained steel would first have to be heated for an hour or more, after complete soaking, at a temperature far above its critical temperature. This would produce a structure intermediate between that of Fig. 1 and Fig. 2, and would obliterate the skeleton work showing the outlines of the previous coarse crystals. Such a casting must then be cooled to a black heat and subsequently reheated slightly above its critical temperature in order to give it the best possible physical qualities. This double process, of course, involves a waste of time, heat and labor, and the bad quality of the coarse structured steel may not always be bad enough to justify this expenditure, but it should be remembered that this double process—and this alone—can redeem steel castings of extraordinarily coarse crystalline structure.

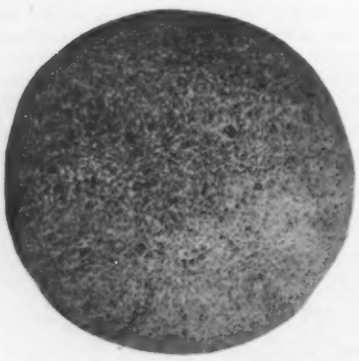


Fig. 1.—Grain of rolled steel of 0.50 per cent. carbon, magnified 40 diameters.

Fig. 2.—Coarse grain of same steel as Fig. 1, due to heating to high temperature; magnified 40 diameters.

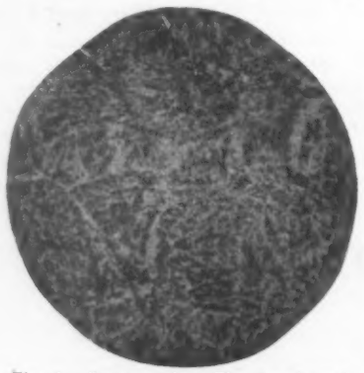


Fig. 3.—Same steel as Fig. 2, reheated to refine the grain, magnified 40 diameters. Note skeleton structure showing outlines of former large crystals.

Another point about the annealing of steel castings, which is not often emphasized, is that slow cooling through that limited interval of temperature known as the "critical range" is detrimental to both strength and ductility. Slow cooling below 1200 deg. F. will improve the ductility of the metal, but slow cooling from 1700 deg. down to 1200 deg. F. develops thicker grains of ferrite and cementite and reduces both strength and ductility. Fig. 7 shows the structure of steel which has been cooled very slowly through this interval, and illustrates the fact to which I have alluded. Fig. 8 shows the critical range of steel and iron. Most of our steel castings contain less than 0.50 per cent. carbon and, therefore, the critical temperatures above which they are to be reheated are located in the line GO. To cool the steel slowly from above the GO to below the line PSK, will develop thick crystals of ferrite and cementite.

Because of this circumstance there has arisen a process of annealing which consists in maintaining the steel castings above their critical temperatures about half an hour

*Paper read before the American Foundrymen's Association.

after they are completely soaked, then pulling them out so the air will blow upon them until they are black heat; after which they may or may not be returned to the furnace and allowed to cool as slowly as they will. Of course, it must be remembered that this method of annealing may set up strains in castings of very complicated shape, and the castings must also be so piled that they will not strain each other during the expansions and contractions which they undergo whilst cooling through the critical interval.

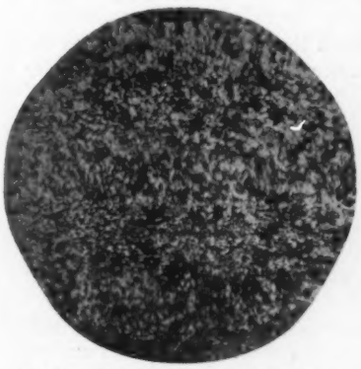


Fig. 4.—Grain of rolled steel of 0.05 per cent. carbon, magnified 40 diameters.

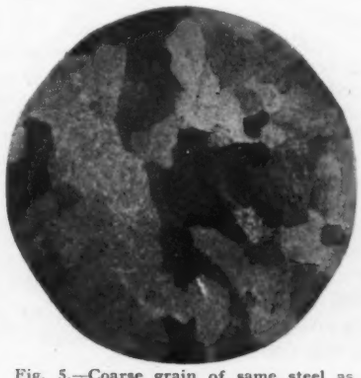


Fig. 5.—Coarse grain of same steel as Fig. 4, due to heating to high temperature; magnified 40 diameters.

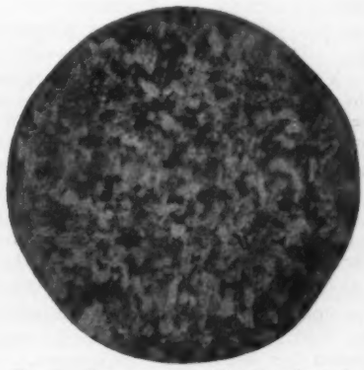


Fig. 6.—Same steel as Fig. 5, reheated to refine the grain, magnified 40 diameters.

Fig. 7.—Steel cooled very slowly from 1650 to 1200 deg. F., magnified 250 diameters.

Seger Cones for Temperature Indication

It may be of interest to the management of foundries to know that Seger cones may be purchased from the chemical supply houses and elsewhere and serve a valuable purpose in annealing work. These Seger cones are little forms of clay, melting at a great variety of temperatures. If these cones be placed in a furnace along with the castings, their melting will show when any particular temperature is attained. It is also possible to put cones in different parts of the furnace to determine the uniformity of the heat.

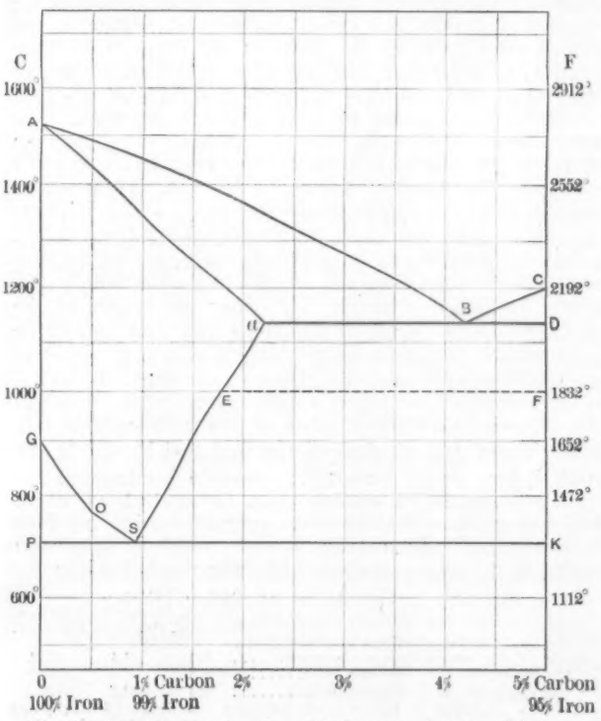


Fig. 8.—Diagram showing the critical range of steel and iron.

An ordinary horseshoe magnet is a valuable adjunct in annealing steel castings because castings of 0.50 per cent. carbon and less, lose the power of attracting a magnet when they reach a temperature of 1550 deg. F., so that in this way we can check up the eye in estimating the temperature of the annealing furnace, and this is especially valuable, because this particular temperature (i. e., 1550 deg. F.) is only a short distance below the correct one for annealing.

Kentucky Iron History

Through the courtesy of William R. Belknap, chairman of the Belknap Hardware & Mfg. Company, Louisville, Ky., we have received a copy of the Louisville Courier-Journal of August 20, giving a most interesting account by John L. Smith of the preparations now under way for the removal to that city of the last of the machinery, fixtures and scrap from the place where the Tennessee Rolling Works once operated, on the north bank of the Cumberland River in Lyon County, Kentucky. Reference was made to the dismantling of this plant in *The Iron Age* of July 27. The article in the Courier-Journal, however, is a much more extensive description of the old plant, and is accompanied by interesting illustrations. It also enters into the history of the works and gives reminiscences in connection with early iron manufacturing in the locality.

In the immediate vicinity of the Tennessee Rolling Works was the old Suwanee furnace, erected in 1847, which was the plant where William Kelly developed his pneumatic process of refining iron at about the same time that Sir Henry Bessemer invented his pneumatic process in England for the manufacture of steel. In that vicinity also was the blast furnace that was built in 1827 by Morris B. Belknap, progenitor of the Belknap family at Louisville. In *The Iron Age* of March 21, 1889, in an obituary of W. B. Belknap, a son of Morris B. Belknap, incidents in connection with the building of this furnace are narrated. In that sketch, and in the article in the Courier-Journal, the trials and triumphs of the Kentucky pioneers in the iron industry are graphically set forth.

Small Open-Hearth Furnaces*

Design of Furnaces for Small Castings Using Oil as Fuel

BY WALTER MACGREGOR†

The design of a furnace, to get the best efficiency from the fuel, depends entirely upon the nature of the fuel to be burned. To get the highest temperature our furnace body should be of such proportions that we could burn the necessary amount of fuel in the smallest possible space, and in order to burn a large amount of combustible in a small space a short flame is necessary. The factors governing the short flame, according to the fuel experts of the United States Navy, are: (1) a pure carbon fuel; (2) Initial heating of the air which furnishes the oxygen for combustion; (3) intimate mixture of the oxygen with the fuel or diffusion; (4) large surface of the fuel presented for impact of this oxygen.

The first factor, the nature of the fuel, is settled for us, as we have decided upon fuel oil, with a probable analysis as follows: Carbon, 83.26 per cent.; hydrogen, 12.41 per cent.; sulphur, 0.50 per cent.; oxygen, 3.83 per cent., and with a specific gravity at 60 deg. F. of 0.926. The heat value of this fuel, according to Du Long's formulæ, would be 19481 B.t. u. per pound. From this analysis we can easily compute the quantity of air required for combustion and the products of combustion for any amount of fuel burned.

Determining the Air Requirements

As a representative size of the small open-hearth furnace we will choose a 5-ton furnace as an example. We are to melt and reduce 5 tons of metal, and from the time of charging the heat till the time of charging the following heat we will assume 4 hr., and as the oil consumed varies so much in different furnaces, we will assume as an average fuel consumption 48 gal. of oil per ton of steel melted in this time, or 1 gal. per minute.

Considering 12 lb. of air required for burning 1 lb. of carbon, and 34.78 lb. of air required for burning 1 lb. of hydrogen, we have from the analysis of the fuel:

9.9912 lb. of air required to burn the total carbon in fuel.
4.2161 lb. of air required to burn the total hydrogen in fuel.

14.2073
.16 correction of amount for oxygen in fuel.

14.0473 lb. air required for complete combustion of 1 lb. of liquid fuel.

With fuel oil of 7.72 lb. per gallon we have 14.047 x 7.72=108.37 lb. air required per gallon of oil.

With air at 13.14 cu. ft. per lb. we have 108.37 x 13.14=1424.11 cu. ft. air required to burn one gallon of fuel oil.

Hence, to burn 1 gal. we must admit theoretically 1424 cu. ft. of air per minute into the furnace. To this we must add the amount of air required in reducing the carbon and silicon in the metal:—10,000-lb. charge, of which 12½ per cent. is pig iron of about 2½ per cent. carbon and the rest steel scrap and billets of about 0.30 per cent. carbon, all to be reduced to about 0.18 carbon at the time of tapping. From this we get the total carbon contents of the bath as 56.5 lb., to be reduced to 18 lb. of carbon, or $56.5 - 18 = 38.5$ lb. of carbon to be burned out in about 2 hr. of reducing the charge, and, as before, 157.6 cu. ft. of air are required to burn 1 lb. of carbon, we have $157.6 \times 38.5 = 6070$ cu. ft. of air required in 2 hr., or 50 cu. ft. per minute. All of this passes off with the products of combustion. In the same way we can determine the amount of air required in eliminating the silicon, which will run about 42 cu. ft. per minute. A certain amount of oxygen is also taken up by the manganese, but this is so small as to be neglected.

With the total theoretical amount of air required, $1424 + 50 + 42 = 1516$ cu. ft. per minute, we are in a position to determine the proper furnace proportions with due regard to the second circumstance in producing the short flame: "initial heating of the air." The volume of air is figured at a temperature of 72 deg. F., which will be about the temperature of air entering our valve. The increase in volume of air at different points along its travel due to its increase in temperature must be the governing factor in designing the ports, flue openings, etc. As the volume of this air increases in a direct ratio to the absolute temperature, it follows that the volume occupied at any point may be computed when the temperature at that point is known.

Sizes of Air Valve and Chimney

In case of the air valve, due to the reversing feature of the furnace, this should be figured rather to accommodate the products of combustion than the entering air, as these are at a higher temperature, and will, therefore, require a greater area of flue. The temperature of the valve is a vital point in the problem of design, for any heat beyond this point toward the stack is lost as far as the furnace is directly concerned, and can only be used in the field of economizers. In determining the size of the valve we will first have to determine the velocity of the products of combustion through the valve due to the draft of the stack, and this in consequence gives as our starting point the design of the stack, which we would naturally consider as our finishing point.

A number of eminent authorities on chimney design have chosen 600 deg. F. as the most economical stack temperature, and Rankine has spent considerable time in trying to prove it in his work on "steam engines." I have never seen an open-hearth stack with that low temperature, and will, therefore, base my calculation on a temperature of 1000 deg. F. as being more nearly uniform with current practice. In my experience with small furnaces I find that the most satisfactory stack draft to be maintained is about 1 in. of water. This is a function of the hight of the stack and the difference in temperature inside and outside the stack. With this difference in temperature and a draft of 1 in. of water, we would get a stack 110 ft. high, and hence we will assume this as the minimum hight to be desired. The velocity of gas due to the pressure head corresponding to this hight of stack and temperature, allowing a 25 per cent. friction factor, is a little less than 15 ft. per second, which is recommended by a number of authorities as good practice.

We have based our calculation, so far, on the theoretical amount of air required for combustion, but will design our stack and flues, as in the case of power-plant design, for an excess capacity of 100 per cent., which would be 3000 cu. ft. of gas per minute, or 50 cu. ft. per second. This divided by the velocity of 15 ft. per second would give a sectional area of stack of 3 1/3 sq. ft., or a trifle over 2 ft. diameter, and we will assume 27-in. diameter of stack as best suited to this furnace, and plenty large enough to permit of any crowding of the furnace. This then will also be the size of the valve and flues leading to the valve from the checker chambers.

Size of the Checker Chamber

The second factor governing the short flames, "the initial heating of the air," spoken of before, is introduced by means of the reversing feature of the furnace through the checker chambers, and these chambers should be so designed as to slow up the travel of the products of combustion, in order that they may give up the major part of their heat to the checker brick, or that part of the heat which is not required to produce the stack draft. The cubical contents of these chambers should not be less than 75 cu. ft. per ton of steel melted per heat, and preferably in the neighborhood of 100 cu. ft. per ton. These chambers should be located behind the furnace and not immediately under the furnace. This point is quite as important in small furnaces as in large ones, as they operate at a higher temperature and we should get the benefit of a good circulation of outside air under the hearth of the furnace. These chambers should be long and narrow or deep, in oil-burning furnaces, giving a very long travel to the products of combustion, before they reach the valve, as on account of the highly volatile nature of the fuel and the slowness with which many of the hydrocarbons mix with oxygen a great deal of the fuel will be out in the stack before it has undergone complete combustion.

The methods of gas analysis, as applied to steam boiler practice, will show some very interesting relations in this regard. In a 5-ton furnace which I have been operating a flue gas analysis will show the following:

	Carbon Dioxide. Per cent.	Carbon Monoxide. Per cent.	Oxygen. Per cent.
At the rear of the checker chambers 24 ft. back of the center line of furnace.....	6.4	3.1	0.2
In the air valve 9 ft. further back.....	8.8	0.3	8.0
In the stack 16 ft. further back.....	9.4	0.3	9.

With a decrease in temperature between the first and last point from 1,750° F. in the rear of the chambers to 930° F. in the stack.

*Paper, substantially in full, read before the American Foundrymen's Association.

†American Steel Foundries, Indiana Harbor, Ind.

In case all the fuel were burned before it reached the stack the sum of the oxygen components of the flue gas would be 21 per cent., as there is 21 per cent. by volume of oxygen in all the air admitted to the furnace, the volume of the carbon element being so small as to be considered zero, but as a matter of fact the sum of the oxygen components at the valve is only 17.1 per cent., and even out of the stack it is only 18.7 per cent., which shows that there is some form of hydrocarbon gas occupying the other 4 per cent. which is getting past the valve unburned and being wasted out in the stack. This, I think, shows very conclusively the necessity of having long chambers and flues in oil-burning furnaces to insure complete combustion of the gaseous fuel before reaching the reversing valve.

These figures are based on atomizing the fuel with compressed air instead of with steam, as with steam the hydrocarbons are slower in taking up oxygen, and a gas analysis at the valve will show a higher percentage of hydrocarbon gas unburned at the valve and a corresponding increase in stack temperature. A sample of gas at the base of the stack when steam was used for atomizing purposes showed the following analysis: CO_2, 7.5 per cent.; CO, 0.4 per cent., and oxygen, 9.5 per cent., or a total of 17.4 per cent. of oxygen components out in the stack which is 5½ per cent. less than shown at the base of the same stack with air, and therefore, a less perfect combustion.

Size of Air Ports and Furnace Body

The third condition governing the short flame, "intimate mixture of oxygen with the fuel or diffusion," bears directly on the size and arrangements of the air ports and the furnace body. The size of the ports depends upon the size of the reversing valve, or vice versa, and the relation between the two is in a direct ratio to the absolute temperature at the two points, these temperatures being 1490 deg. F. at the valve, and 2800 deg. F. at the ports, or in a ratio of 1 to 2. The ports, therefore, should have an area of twice the area of the reversing valve. We will, therefore, have a total port area at one end of the furnace of about 7 ft. These ports should be carried out the full width of the furnace to prevent any short circuit of air through the furnace body, as the travel of gas through the furnace body should have the same velocity at all points to get the proper diffusion. These air ports should come well up above the hole in the monkey wall through which the oil burner enters the furnace, so that the air must come down on top of the flame rather than underneath it. This is a very important factor in designing a hot-working furnace.

The space to be allowed for hearth in small furnaces should not be under 10 sq. ft. per ton of charge and then, too, the shape should approach more nearly a square than the oblong shapes in general use, as this tends to give a better effect of the radiation of the walls and roof, and by widening the furnace we lessen the cutting action of the flame on the side walls and keep down the repair bills.

As to the length of the furnace body, this should be governed by the length of the oil flame, for the hottest part of the flame should be about the center of the furnace. It has been my experience that I have not been able to get a flame that was intense enough to melt down a charge of metal any less than about 8 ft. from the tip of the burner to the hottest part of the flame, and as the tip of the burner should stick clear through the monkey wall, which will extend 9 in. beyond the ports of the furnace at least, we will get as a minimum furnace length twice the length of the flame as mentioned above, plus twice the width of the ports, plus twice the thickness of the end walls, plus twice the 9-in. extension of the monkey wall beyond the ports, or a total of about 22 ft., as the minimum length of the outside of the furnace body.

Compressed Air for Atomizing Oil

The fourth circumstance governing the short flame, "large surface of fuel presented for impact of oxygen," as a matter of oil burners and atomizing agents, and has furnished inspiration to thousands of inventors—all to very little purpose. The matter of atomizing this fuel oil is one of overcoming the surface tension of the oil and breaking it up into very fine particles, so that it will present greater surface for contact with the oxygen, and the two methods in use, superheated steam and compressed air, give a mechanical efficiency so small that you can barely find it at all.

There is a great deal of discussion at the present time on the needless waste of using compressed air for atomizing purposes when superheated steam will answer, but in the small casting business one of the main difficulties is getting the metal hot enough to run the thin sections in the molds, and since, by its very nature compressed air, while atomizing the oil, furnishes at the same time oxygen for combustion, and that, too, very intimately mixed with the oil, it is quite evident that by using air we would get quicker combustion, a shorter flame and a somewhat hotter furnace.

In conclusion, I will say that in operating a furnace designed along these lines it will not be a difficult matter to get out six 5-ton heats in 24 hr., and still have the metal hot enough to pour many castings weighing a fraction of a pound each. With a 5-ton heat it is not uncommon to pour as high as 175 molds, consuming about 50 min. in pouring. The metal must, therefore, be extremely hot at the time of tapping the heat.

The Cost of Producing Alabama Pig Iron

The market letter of Matthew Addy & Co. for September 2 has the following concerning the ability of Southern blast furnaces to make money on the $10 basis for No. 2 foundry iron at Birmingham: "As a matter of fact, $10 f.o.b. Birmingham for No. 2 is not an attractive price, even to the furnaces that can most cheaply make iron. All of the iron produced is not No. 2. A good deal of low-grade iron is made, even by the best iron makers, and this brings from 50 cents to $1 less money than No. 2. There has been a lot of nonsense written about $6 iron. Some of this nonsense has even been repeated in Congress. The people of Birmingham who boasted of $6 iron never did a more foolish thing. Some iron, years ago, undoubtedly was made in Alabama at that cost. But then they paid labor not to exceed $1 a day, and they had rich ores on the surface—not mines half a mile in the ground as today. And at a producing cost of $6 there was no margin for depreciation or repairs, no accounting for wear and tear and no charge for capital invested, let alone a reasonable profit. In no sane scheme of bookkeeping were the furnaces then getting back a new dollar for an old one. In these days labor is getting fair wages, raw materials are vastly more expensive than ten years ago and bondholders demand their interest regularly, while shareholders modestly expect now and then some little return. Ten dollars, Birmingham, means that raw materials—the potential wealth of the country—are being consumed simply for the sake of consuming them. At that price, if a blast furnace were like a steamboat, so to speak, it would be tied up to the wharf and allowed to wait until there was more water in the river. The South, if its iron industry is to thrive, simply must get more money. This is being realized and the policy of selling just to sell at any old price is not so much in vogue as once was the case. Consumers themselves prefer to pay higher prices for iron, for the history of the trade is that the consumer is more prosperous and finds more profit in his business when iron is nearer the top than the bottom level."

The annual report of the National Enameling & Stamping Company for the year ended June 30, 1911, shows gross profits of $1,718,671. Income from investments, etc., brought the total income up to $1,740,005, an increase of $44,838 over the previous year. Renewals, repairs, interest charges, etc., amounted to $611,919, and net profit for the year was $1,074,085. After appropriations for sinking fund, interest, and charges there remained a surplus for the year of $171,156, which was $92,476 less than the previous year's showing. The total surplus and reserve at the close of the year was $3,278,301.

With the railroads discriminating against every other town on the map (see Interstate Commerce Commission's complaint files for verification) it is wonderful how few waste places there are, says the Wall Street Journal.

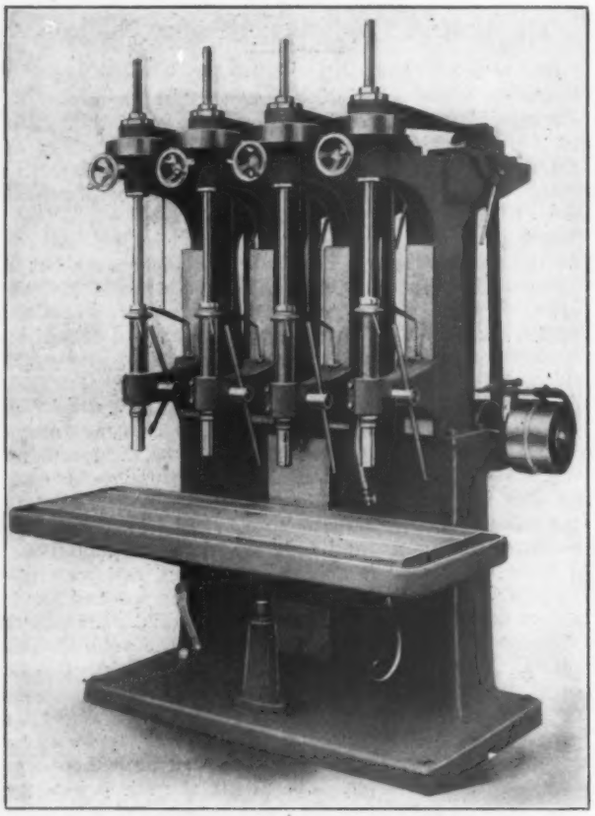
The new bar mill of the Lackawanna Steel Company, Buffalo, N. Y., was completed and placed in operation last week, largely increasing the mill capacity of the company's plant.

Avey No. 3. Drill Press

In addition to its No. 1 ball-bearing drill press which was illustrated in *The Iron Age*, October 27, 1910, the Cincinnati Pulley Machinery Company, Cincinnati, Ohio, has recently placed on the market a new type, which is known as the No 3 tool. Four different sizes, having one, two, three and four spindles respectively are built, the last being the one illustrated.

The drill is designed to handle work up to the limit of capacity of drills having a No. 3 taper shank. Ball bearings are used throughout and all the cones and the ball races are of hardened and accurately ground steel, the bearings being of the four-point contact type. The design of the tool enables it to be run at the maximum speed which high-speed twist drills are capable of and at the same time requires the minimum of oiling and power.

The spindle of the machine is of crucible steel 1 13/16 in. in diameter and is bored to conform with the No. 3 Morse standard taper. The sleeve is graduated and the



The Avey No. 3 High-Speed Ball-Bearing Press Built by the Cincinnati Pulley Machinery Company, Cincinnati, Ohio.

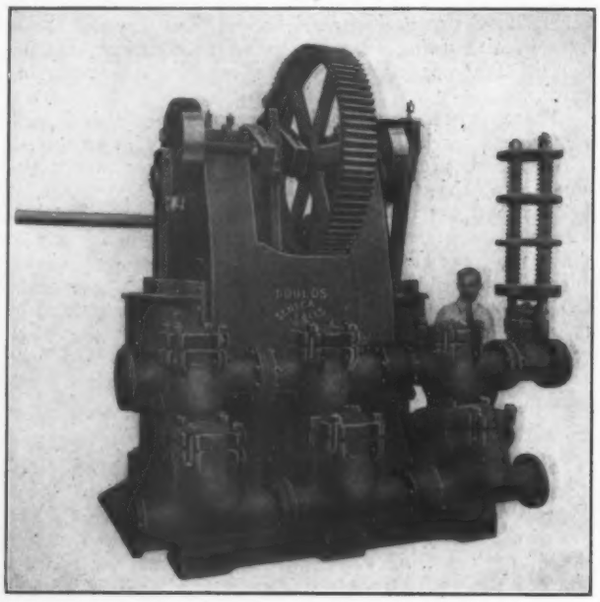
stop collar is mounted thereon, that may be set to drill holes at any predetermined depth, not exceeding the feed of the spindle which is 8 in. without using a scale. This column is held in place by a fixed clamp screw and no wrench or screw driver is consequently required.

Four spindle speeds are obtained for each spindle, the drive being by 2-in. belt. Each spindle has a belt tightener carrier controlled from the front of the machine by hand wheel and screw feed, which gives positive and precise belt tension. The distance from the center to the column face is 12 in. and the weight of the four-spindle machine is approximately 4000 lb. If desired a lubricating outfit can be supplied, the inside of the lower portion of the column forming the reservoir. The tables can be furnished either with or without T slots and both types are supplied with a heavy groove around the edge to take care of the lubricant.

The Goulds Triplex Pump

For operating at high pressures, from 215 to 1500 lb., the Goulds Mfg. Company, Seneca Falls, N. Y., has placed on the market a new single-acting triplex-plunger power pump. The general construction of the pump greatly resembles an older type which has been extensively used for water works, fire protection systems, hydraulic elevators, oil pipe lines and in mines. It differs markedly in the gearing, as the older pump had two sets of gears and pinions, one on each side of the standards, while the new type has but one gear and one pinion which are located between the standards as shown.

Locating the gearing in this position has of necessity lengthened the right side of the pump slightly and correspondingly increased the distance between the two valve



The New Single-Acting Triplex-Plunger High-Pressure Pump Built by the Goulds Mfg. Company, Seneca Falls, N. Y.

boxes on that side. Instead, however, of lengthening the pipe connecting the valve boxes and making each set a different shape distance pieces are put in between the right and the middle set as shown. In this way the three sets of valve boxes are identical in form and are interchangeable, a feature which not only saves time when repairs are needed, but also reduces the number of parts that must be kept in stock by the large user who may be located at a great distance from the factory.

Sly Foundry Equipment

The W. W. Sly Mfg. Company, Cleveland, Ohio, states that increasing business in its dust arrester and sand blast department has compelled the erection of a new two-story building, 60 x 115 ft., which is constructed of steel and cement. From the present outlook it appears as though by next spring the building will have to be enlarged. Orders for tumbling mills are coming in well, and the company is now working its plant 12 hours per day.

A small sand-blast apparatus has just been set up in one part of the factory, showing three different ways of sand blasting. One is the Sly sand-blast tumbling barrel, another is the gravity-feed sand blast and the third is the tank pressure sand blast. All of these machines handle the sand automatically, take care of the dust, clean and elevate the sand and return it to the hoppers where the clean sand returns to the sand-blast machine. Workmen have nothing to do in handling the sand, except now and then to dump a fresh wheelbarrow load of it on the floor. These machines have been erected in the factory expressly for demonstrating purposes, and the company is always pleased to receive its out-of-town friends and demonstrate what it can do for them in regard to sand blasting.

C. R. Rogers & Co., Corry, Pa., engineers and contractors, recently prepared plans for a new manufacturing plant for the Kurtz Brass Bed Company, of the same place, to be 100 x 250 ft., having concrete floor, brick walls and timber roof. The plant will be located along the Erie Railroad, and will have a larger capacity than the present one. A new 100-hp. Ajax gas engine will be installed, while the manufacturing equipment in the old plant will be used.

Strode Packing Tool

Patents have been recently granted to Edward P. Strode of the New York Edison Company, New York City, covering a new type of packing tool intended to be used for packing condenser tubes in power plants. The tool is operated by compressed air or steam and its use is said to result in a large increase in a number of tubes which can be packed per hour, as compared with the results secured with a hand packing tool and a hammer. An exterior view of the new tool is given in Fig. 1, while Fig. 2 is a section showing details of its construction.

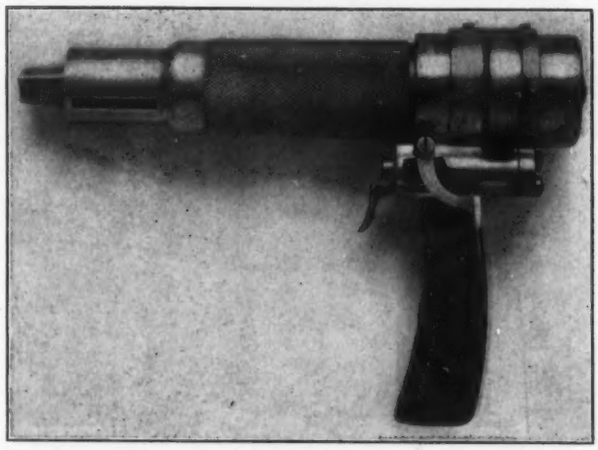


Fig. 1.—A New Tool for Packing the Ends of Condenser Tubes Patented by Edward P. Strode, New York City.

As will be noticed the tool resembles a pistol in appearance. Referring to Fig. 2, which is a sectional view showing constructional details, the breech or body part of the tool *a* is integral with the handle. The barrel *b* has vent holes and a diminished end. All three parts are held together by screw threads. A tubular reciprocating plunger, *c*, has a piston, *d*, which fits closely within the barrel. The guide tube *e* is enlarged at its outer end to form a guideway for the reciprocating plunger and is screwed into the breach. Within the inner surface of the guide tube there is a rotary shaft, *f*, with an enlarged journal bearing at its outer end. This tube is enlarged still more at *g* so as to leave space between it and the small end of the barrel for a guideway for the plunger. The end of this enlarged part is turned down into the form of a frustum of a cone at *h*, and has a shoulder which fits accurately against the end of the tube where the packing is to be inserted. This enlarged part also

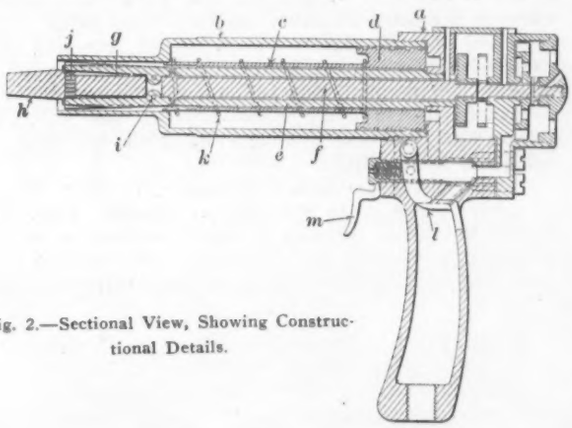


Fig. 2.—Sectional View, Showing Constructional Details.

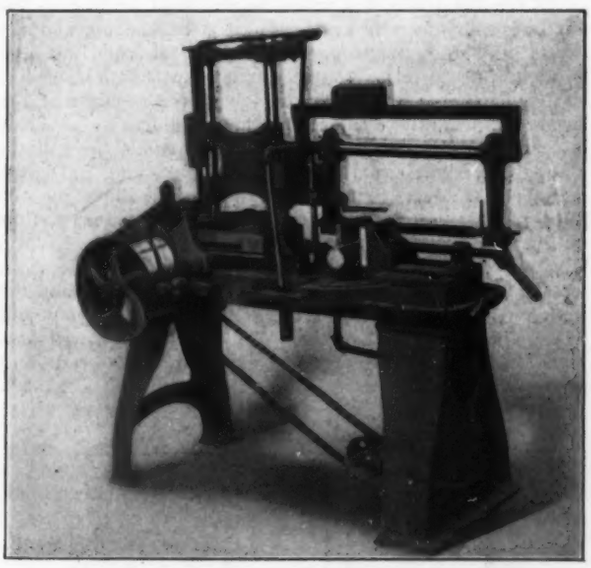
constitutes a cylinder around which the packing cord is wound before the tool is used. A longitudinal groove in the body part in which a longitudinal finger is pivoted upon the pin *i* is provided for securing this cord. The finger is grooved at its outer end and a spiral spring, *j*, is inserted in a boring in the enlarged portion of the tube *g*, the arrangement being such that normally this finger is held at its outer end against the inner surface of the diminished end of the barrel.

In operation the packing cord is inserted at the outer end of a slot through the diminished end of the barrel and is forced in sufficiently so that the friction between it and the inner surface of the small end of the barrel is enough to wind it firmly around the tube *g* when the shaft *f* is rotated. Compressed air is led to the tool through a hose and is admitted through an opening on the bottom of the handle to the body of the barrel. This opening is divided into two parts, one for conveying the air to the piston *d* and the other to the rotating motor. When the operator presses the valve lever *l* after the packing cord has been inserted, air is admitted to the motor. The motor imparts motion through gearing to the enlarged portion of the shaft *f* thus drawing the cord through the opening and winding it around the enlarged portion until it has been completely drawn in and is in a position to be operated upon by the reciprocating plunger *c*. The operator then releases the valve lever and inserts the coned end *h* of the tool into the end of the condenser tube. The trigger *m* is then operated successively a number of times until the cord has been driven, the number of blows depending upon the density which it is desired to give to the packing. The tool is then removed and the set-nut secured in position in the regular way.

As compared with the hand method of packing, as high as 28 tubes have been packed per minute instead of 40 per hour. The average, however, for a day is from 10 to 15 tubes per minute.

New Sterling Power Hack Saw Machine

A new high-speed power hack-saw machine, known as the No. 2½, has been placed on the market by Diamond Saw & Stamping Works, 357 Chestnut street, Buffalo, N. Y. The general type of machine was illustrated and described at length in *The Iron Age* of January 21, 1909; but the present machine has a cutting capacity up to 7 in. of either round or square bars, takes blades 10 to 15 in. in length and weighs 380 lb. net. It is equipped, as indicated, with the automatic lift, raising the saw blade on the return stroke and thereby saving wear on the blade. The device is adjustable so that the full length of the blade may be used and the vise swivels so that cutting may be done at a 45-deg. angle. While there is an automatic shut-off and the blade is lifted automatically, as stated, it is emphasized that the automatic arrangements are accomplished without intricate devices likely to get out of order.



New Hack Saw Machine Made by Diamond Saw & Stamping Works, Buffalo, N. Y.

The General Contractors' Association, room 2508, 13-21 Park Row, New York City, of which C. A. Crane is secretary, has undertaken an important piece of work in endeavoring to secure the prevailing rate of wages in various localities throughout the State of New York for the purpose of establishing an authentic bureau of information on the subject of wages. The occupations covered comprise not only the building trades but all classes of labor in connection with contract work.

Pulsometer as Power Plant Pump

A Recent Application of This Device

In power plants a new type of pump is coming into use in addition to the ordinary reciprocating and the centrifugal styles. The special advantages of the pump, as described by the builder, the Pulsometer Steam Pump Company, 17 Battery place, New York City, for this particular class of service, are simplicity, lightness and cheapness. Figs. 1 and 2 show the external appearance and the internal construction of the pump respectively.

Simplicity of construction is secured as there are no mechanically operated parts and the filling and emptying of the pumping chambers is automatic. Since there are no rubbing contacts no lubrication is required, a feature that possesses a special value when the Pulsometer is used as a sump pump or where it handles the boiler feed water. It is emphasized that the Pulsometer is light for its capacity, which is an important factor in emergencies or doing reconstruction work since it can be hung from beams or timbers or suspended by a rope if necessary.

Referring to Fig. 2, it will be seen that the Pulsometer consists of a hollow one-piece casting having two bottle-shaped chambers *a a*, with their necks communicating at the top and each opening into a common outlet chamber, *b*, through a check valve. An air chamber, *c*, connects with the suction inlet and serves to cushion the incoming pulsations. In operation the steam from the boiler is admitted to the top of the pump and enters either the right or the left pumping chamber, depending upon the position of the steam ball valve at the top. Assuming that the left chamber is filled with water, the pressure of the steam depresses the surface of the water without agitation and forces the water through the two check-valves into the discharge pipe *d*.

When the water has fallen to the level leading to the discharge chamber its even surface is broken up, and the water and the steam are thoroughly churned up and brought into intimate contact on account of the peculiar design of the pumping chambers with the result that the steam is instantly condensed. This condensation forms a vacuum in the left chamber which is assisted by a slight upward pressure in the other chamber and pulls the steam valve over to the other seat and shuts off the supply of steam to the left chamber. The vacuum thus produced draws in a charge of water through the suction pipe, and while the left chamber is filling up, the right one is emptying. It will be seen in this way that the action of the pump consists in alternately emptying and filling the pumping chambers. These operations will continue as long as the pump is supplied with steam and water and they follow each other rapidly and with such regularity that practically a continuous stream of water leaves the discharge pipe. Each pumping chamber has an inwardly opening air valve which draws in a supply of air every time a vacuum is formed in either chamber. This air forms a layer on the top of the water which acts as a sort of piston and keeps the water and the steam from coming in contact too early and at the same time also serves as a cushion to deaden the shock of the water as it rushes in.

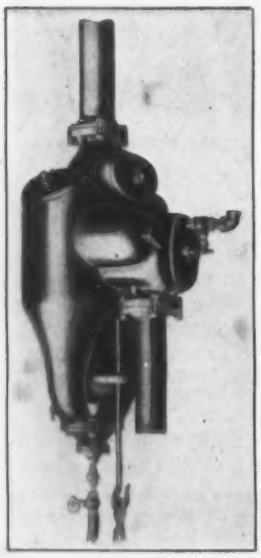


Fig. 1.—Exterior View.

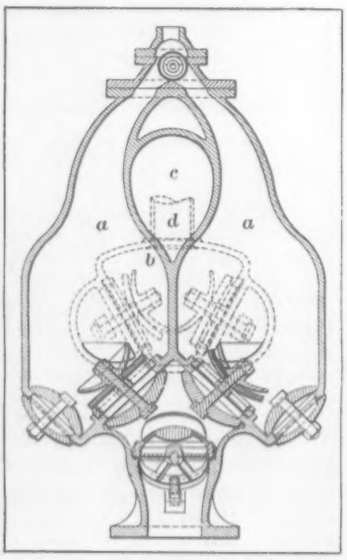


Fig. 2.—Sectional View.

Two Views of the Pulsometer Made by the Pulsometer Steam Pump Company, New York City.

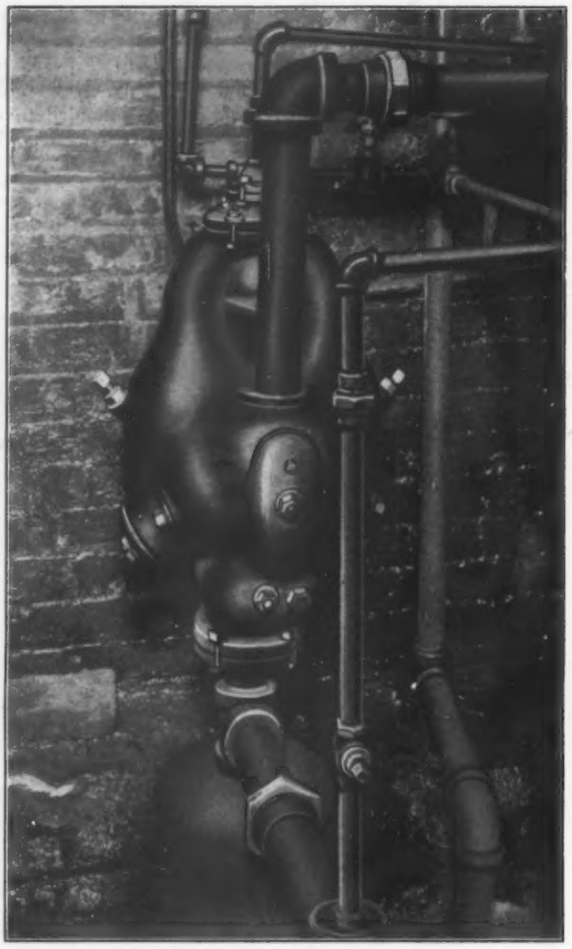


Fig. 3.—The Pulsometer Employed as a Sump Pump in a Large Office Building.

In Fig. 3 a Pulsometer is shown permanently installed in the power plant of a large New York office building where it is doing duty every day as a sump pump. When employed for this class of work or for returning drips and other water to open heaters the pump may be said to have a high thermal efficiency, for all the steam that is condensed in the pump is mixed with the water and returned to the boiler feeding system, the only heat loss being due to radiation.

These pumps are built in a number of sizes, ranging in delivery from 20 to 2000 gal. per minute. Tests made on the Pulsometer have, it is stated, resulted in securing a maximum duty of over 23,000,000 ft.-lb. per 100 lb. of coal, the average figure being 15,000,000 ft.-lb.

The Fuller & Johnson Mfg. Company, Madison, Wis., has sold its implement business to the Madison Plow Company, which will continue to manufacture the Fuller & Johnson line of implements. Its present customers can secure repair parts, etc., from the Madison Plow Company. The Fuller & Johnson Company will hereafter devote its entire attention to the manufacture of gasoline engines, including its complete line of double efficiency farm pump and multi-motor engines. The implement factory is now being dismantled, and is to be remodeled for the manufacture of engines. This change has been brought about by the rapid growth of the company's engine business and the need for additional room for this purpose.

The Sweet & Doyle Foundry & Machine Company, Green Island, Albany County, N. Y., is installing new machinery in its machine shop to take care of larger work.

The Andresen-Evans Type B Grab Buckets

A New Style for Three-Line Operation

Operating grab buckets by three or more lines has resulted in the development by the Andresen-Evans Company, Monadnock Building, Chicago, Ill., of a new style known as the type B bucket. In a great many respects this bucket does not differ very materially from the company's type A bucket which was illustrated in *The Iron Age*, September 1, 1910. The new style is, however, operated by three or more lines instead of two and in designing it the overall hight, both opened and closed, has been reduced. This change, which is a very material advantage in unloading from vessel holds, has been secured by substituting an opening device that consists of two bar connections in compression operating from the vertical sliding pivot blocks to which the opening cables on each side are fastened for the lever brackets and the tension chains of the other type. Fig. 1 illustrates the bucket closed while a view of it when opened and showing its extensive reach is given in Fig. 2.

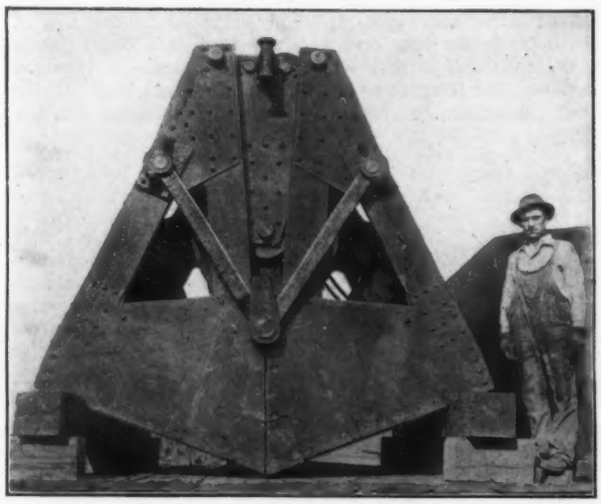


Fig. 1.—The New Type B Grab Bucket Built by the Andresen-Evans Company, Chicago, Ill.

The actual reduction in the minimum vertical clearance in which one of these buckets can be operated is clearly brought out by a comparison with the type A bucket. The overall hight for a 2-yd. bucket is 8 ft. 10½ in. for the type A grab and 7 ft. 6 in. for the type B. In the opened position, Fig. 2, the difference is even more pronounced. Formerly the overall hight increased from 8 ft. 10½ in. to 9 ft. 7½ in., while in the new bucket this dimension actually decreases 3 ft., making the hight when opened 4 ft. 6 in., a difference of more than 5 ft. between the two.

With the exception of the decrease in the hight, the design of the grab remains the same and the advantages peculiar to the type A bucket of digging action and direct closing pull parallel with the line of the lip travel have been retained. It is pointed out that the design of this bucket and the arrangement of the hoisting and the closing lines results in securing more service from the cables. The opening lines are directly connected to the bucket and do not pass over sheaves, with the result that excessive wear is eliminated. Where cables are employed inside the bucket for closing it instead of chains they are short and are not a part of the hoisting line. In this way it is not necessary to take out the hoisting cable and renew it when the closing cables wear out. Records of this bucket in service show that cables previously discarded for service in other buckets have given satisfactory service on buckets of this company for 6 months and as closing cables for a period one-third as long.

Another advantage of the reduced clearance aside from enabling the bucket to be employed efficiently in unloading the holds of vessel is an increase in the hight to which material can be placed on stock piles under ore bridges.

Carnahan Genuine Charcoal Iron Tin Plate

The Carnahan Tin Plate & Sheet Company, Canton, Ohio, has issued an interesting booklet entitled "The True Story of Genuine Charcoal Iron Tin Plate," which gives a description of the process employed by the company in manufacturing this product.

The process starts with "the best and most refined material that it is possible to obtain, regardless of cost." This is melted in a double cold-blast knobbling fire, using nothing but charcoal as a fuel. After this iron is worked in the knobbling fire, the ball developed is taken to a steam hammer and hammered into a bloom weighing about 350 lb. This is subjected to a white or welding heat, when the bloom is again placed under the hammer and given a second hammering to insure absolute solidity. After another heating the bloom is taken to a mill and rolled into a bar; this is cut into convenient lengths, piled four high, and these piles are heated until the several bars are welded into a comparatively solid mass. The piles are again put through the bar mill and rolled into sheet bars, which are cut up into suitable lengths for rolling into sheets. The following chemical analysis of the company's black plate was made by the Bureau of Standards, Washington, D. C.: Carbon, 0.03; manganese, 0.03; silicon, 0.024; sulphur, 0.012; phosphorus, 0.041.

The company contemplates the installation of a new and larger steam hammer in its forge department.

The M. Mitshkun Company, specializing in railroad equipment and making switches, frogs, crossings, rails and fastenings, has moved its offices, shops and yards to larger premises at Dix avenue and the Michigan Central Railroad, Detroit, Mich.

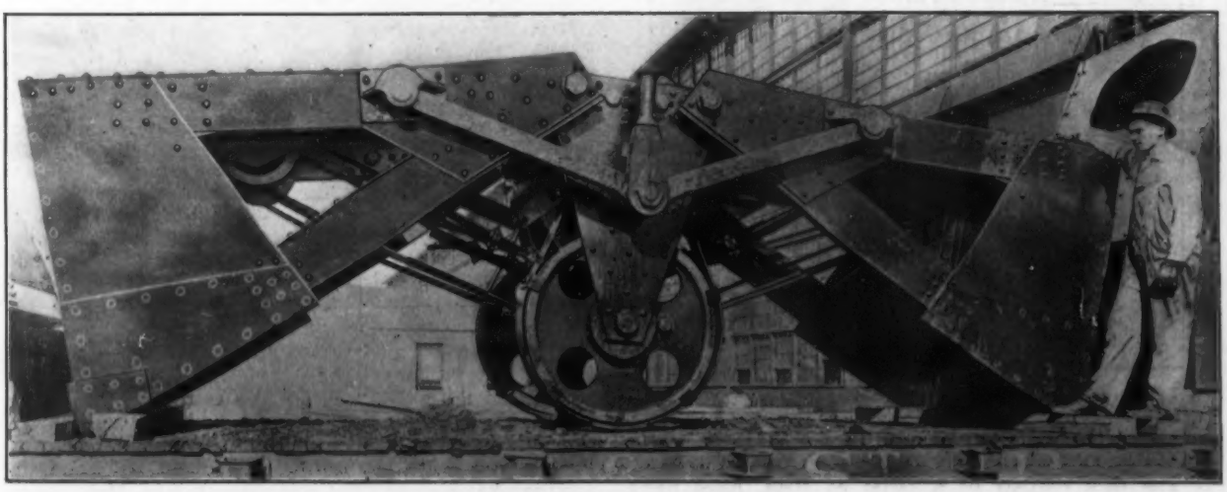


Fig. 2.—The Bucket Opened Showing its Extensive Reach.

The Driver Drill Rack

Causing the various tools used in a shop to be put away in their proper places is the principal value claimed for a new tool rack made by C. H. Driver, 1423 Sixteenth

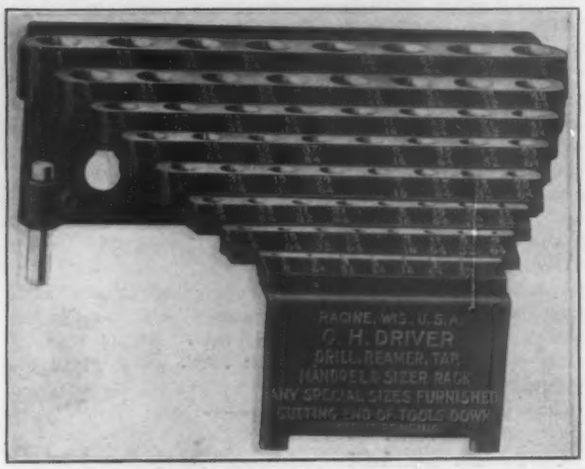


Fig. 1.—The New Drill Reamer, Tap, Mandrel and Sizer Rack Made by C. H. Driver, Racine, Wis.

street, Racine, Wis. The rack will accommodate the sizes of drills, taps, reamers, mandrels and sizers ordinarily employed in machine shop operations and the tools will be put away in their right places without having to stop to measure the sizes. At the same time the rack also acts as a safeguard or check since when a tool is removed, its size is indicated, which fact insures the proper one being used for a particular job. Fig. 1 is a view of the

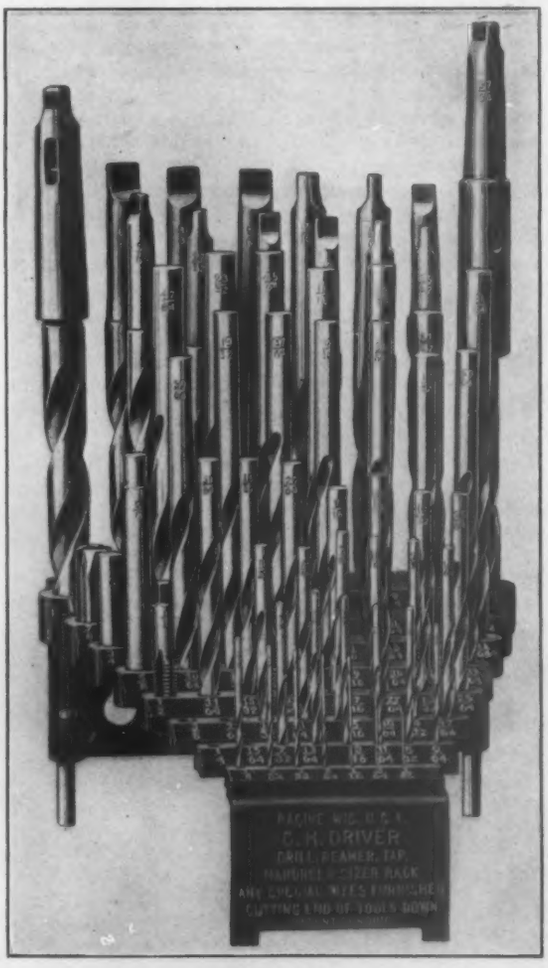


Fig. 2.—The Rack Filled with Tools.

rack when empty showing its construction, while Fig. 2 illustrates it filled with an assortment of tools.

The rack consists of a series of steps, holes being bored in the treads to accommodate the tools, the diameters of which are indicated on the beveled face of the risers. The tools are put away simply by inserting them in the holes which correspond to their diameters without referring to the size marked on the tools or the rack. If the size of the tool has been rubbed off when slipped in a chuck it is simply necessary to find the hole in the rack in which it will stay. This does away with the necessity of calipering or looking up a drill gauge or micrometer. In this way tools can be put only in the proper place, as it is impossible to put drills in a larger hole than they will fit or to force them into ones that are too small.

While the rack illustrated shows one size, it is possible to have it accommodate additional tools, as it is built on the sectional plan. The parts are interchangeable and the extension can take place either in front or at one side. The sections can be supplied for either fractional, numerical or letter arrangements. The variation in the size of the holes in the fractional rack can be had in 64ths, 32nds, 16ths and 8ths, as may be desired. Different sections can be furnished to meet any special arrangement, such as, for example, where two or more tools of the same size are desired.

A New Foundry Flux

A metallic reducing agent or flux, which it is claimed will not temper the alloys in which it is used, has been placed on the market by the New Era Mfg. Company, Kalamazoo, Mich. This flux is known as the Meta-loyed-flux and is used for deoxidizing purposes in molten brass or bronze and aluminum casting alloys as well as in the manufacture of copper castings and in melting mixtures containing scrap material. The special advantages claimed for this flux, aside from its non-tempering property, are preventing excessive shrinkage, porous formations, blowholes and cold-shuts and increasing the fluidity, density and ductility of the material being cast.

The prevention of the formation of pores and the defects in the castings is effected by the neutralizing action of the flux upon the nascent oxides of the molten alloys. The increase in the fluidity of the metal is an advantage where castings having small or thin portions are to be poured. The amount of flux used per 100 lb. of metal varies from 2 to 3 oz., according to the nature of the material, and if mixtures containing scrap are being melted from 25 to 50 per cent. more flux must be employed. When used with aluminum the flux is added before removing the crucible from the fire, while with brass, bronze and copper the crucible is first removed. The mixture is stirred and skimmed in the usual way before pouring. As compared with phosphor tin the cost per pound of Meta-loyed-flux is 25 per cent. less, while one pound, it is said, will go further than three times that amount of tin and will give more satisfactory results.

The Titusville Iron Company, Titusville, Pa., builder of gas and steam engines, tubular boilers, etc., advises through Louis C. McKinney, its president, that it is operating its boiler shop and foundry machine departments full time and is employing a complete force of men. The volume of business booked will enable it to continue full operations for some time ahead. August was the largest month from a sales standpoint this year, and if current business holds up well the present year will be the best in the company's history. W. J. Harman, formerly superintendent of the boiler shop of the Erie City Iron Works, Erie, Pa., is now general superintendent of the Titusville Iron Company.

The influence of a name is shown in the recent decision of the Gibbs Gas Engine Company to change its name to the Standard Gas Power Company, owing to the fact that the former name tended to indicate that the company was engaged in the manufacture of gas engines only. It is stated that the former name resulted in considerable confusion, and the present name has been selected as defining the wider scope of the business; namely, the manufacture of gas producers, for both fuel and power, as well as of gas engines. The general offices of the company are in the Walton Building, Atlanta, Ga., and the company has also an office and salesroom on Main street, Jacksonville, Fla.

The Machinery Markets

Business in the machinery trade is decidedly irregular. In Cleveland some dealers report their August sales to be 20 per cent. over the preceding month and there is an excellent demand in that market for foundry equipment. Business is below normal in Cincinnati and in Detroit. Trade is quiet in New York, although there is an excellent export demand. The export business holds good in other markets. In Philadelphia the demand is quiet. Metal working machinery is not selling well in Baltimore, but there is a good call for contracting equipment. Irrigation projects continue to hold the attention of the trade in Texas, and some heavy business is looked for from that source shortly. A good demand for machine tools continues elsewhere in the South and there is a good volume of inquiries. Irrigation machinery is selling well on the Pacific coast, but the call for metal working machinery is not very heavy.

New York

NEW YORK, September 6, 1911.

Export business continues to support the machinery market. Some large sales of mining machinery have been made for delivery in Mexico and the Japanese engineering firms in this city have been buying for railroads in that country. Some good business has come from German car and locomotive manufacturing companies and English and French machinery makers are good customers for American machine tools just now. The railroads are buying a tool here and there but they show no disposition to close any business of real importance. The New York Central Railroad continues to defer purchasing against the extensive list it has had before the trade for several months, although there are rumors current among machinery men that buying will be begun within a few days. Machinery men who handle contracting machinery, such as hoisting engines, dredges, steam shovels, etc., are doing a good business and there is an improved call for heavy engines. Houses that handle metal working machinery do not find business so good. Orders are coming in for single tools in good volume, but there is no large buying from any one source.

The Bradley Contracting Company, 1 Madison avenue, New York, has purchased a site in Long Island City, near the Queensboro Bridge, on which will be erected a machine shop in which the company proposes to make repairs on its contracting equipment. The property is on the river front and is 400 x 500 ft. The company will operate its own line of boats to transport material from the shops to the scene of its subway construction operations.

Charles D. Durkee & Co., 2 South street, New York, has acquired a large site at Grasmere station, Staten Island, fronting 700 ft. on the Staten Island Rapid Transit Railroad. The company is having plans prepared for the erection of a brick factory building for the manufacture of marine hardware. The erection of dwellings for employees is also included in the plans of the company.

The Union Tool & Supply Company, 103 Chambers street, New York, has been incorporated under the laws of the State of New Jersey with $10,000 capital stock. Ivan Spangenberg, Thomas J. Wasser and Theodore Rurode are the incorporators. No manufacturing plans are yet announced.

The Old Forge Company, Moodna, N. Y., has been incorporated to manufacture paper with a capital stock of $100,000. J. B. Waykins, R. C. Kastner and V. E. Smith, of New York City, are the incorporators.

The North Tonawanda Musical Instrument Company, North Tonawanda, N. Y., has awarded the contract for the erection of a four-story addition 50 x 150 ft. to its plant at Payne and Sommers avenues and the Erie Railroad; also a building 40 x 90 ft. to be used as a boiler house, dry kiln and buffing room.

The Victor Motor Truck Company, now located at 1455 Niagara street, Buffalo, N. Y., has awarded the contract for the main building of its new plant on a four-acre site at Beaver road and the New York Central Railroad just north of the city. The building will be 60 x 270 ft. and one story, of brick and concrete construction.

The Wilson Aero Company, Buffalo, has been incorporated with a capital stock of $100,000 to manufacture aeroplanes under the patents of John A. Wilson, Jr., constructed with two motors and a device to prevent the machine from falling should either or both motors fail. The present offices of the company are at 705 D. S. Morgan Building.

The National Carbonic Gas Company, Buffalo, is building a fireproof factory at 871 Seneca street.

The West Haven Mfg. Company, manufacturer of saws and hack saws, New Haven, Conn., is having plans prepared for an addition and will make other extensive alterations to its works.

The Rhode Island Tool Company, Providence, R. I., has let contract for an addition to one of its buildings which will add a floor space of about 14,000 sq. ft.

The Abbott Ball Company, manufacturer of steel balls for burnishing metal goods by tumbling, Hartford, Conn., has purchased a site in the Elmwood district and is contemplating the erection of a new factory. Plans are now being drawn for a building 40 x 100 ft., two stories, of modern mill construction. The company is interested in literature relative to fuel oil engines and will appreciate any information that can be given on this subject.

Catalogues Wanted.

H. K. Kouyoumjian, 701 Commercial Building, Cleveland, Ohio, desires catalogues from American manufacturers of machinery.

Philadelphia

PHILADELPHIA, PA., September 4, 1911.

The volume of business transacted by local merchants and manufacturers of machinery and tools in this district in August can scarcely be called satisfactory. Considerable irregularity in the placing of orders was noted and in but few instances have gains been made over the previous month. Buying was spasmodic; a period of activity, which would have a tendency to make the trade feel that better conditions were at hand, was almost invariably followed by a period of extremely light buying. As a rule business during the first half was better than that of the last half. Builders of machinery have, in a few instances, been a little bit better off as far as work ahead is concerned, but few have made any increase in the productive rate. Several builders of special machinery doing an established export trade report that demand to have been easier in August. Little new business develops in the export of tools of the usual standard types. Business in the closing week of the month showed no improvement, orders being usually confined to single tool propositions. The railroads continue light buyers of machinery or tools, although some further locomotive and rolling stock orders have been placed. The second hand machinery market is quiet. Boilers and engines are in fair demand, but pending business closes slowly. Little change is reported in the foundry situation, in instances steel casting plants as well as gray iron foundries have a little better volume of orders on hand.

The Ferracute Machine Company, Bridgeton, N. J., reports the demand for its varied line of presses and sheet metal tools as having been somewhat lighter, as is customary at this season of the year. Several good domestic contracts have been taken, but foreign orders have declined. A material improvement in business is, however, anticipated during the next few months.

J. G. Speidel, Reading, Pa., notes a material increase in the demand for cranes of various types. That for elevators has been well sustained since early in the year and the various departments of the plant are actively engaged.

Proposals will be received by A. F. Hammond, superintendent of supplies Board of Education, City Hall, Philadelphia, for laboratory scales and balances, calipers, micrometers and other instruments and materials required for use in the annex of the Central High School, located in Germantown and Frankford. Bids will be received until September 12 and the expenditure for the equipment is limited to $20,000. A full description of the articles required may be obtained at the office of the superintendent, room 392, City Hall.

The Hilles & Jones Company, Wilmington, Del., has been booking sufficient orders, largely in the nature of single tools, to enable it to maintain an average output

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of about 75 per cent. The demand, however, has been irregular, a comparatively good week or two being frequently followed by several weeks of comparative dullness.

The Pennsylvania Equipment Company, West End Trust Building, is in the market for a 30 to 36-in. vertical boring mill, a 5-ft. radial drill, acetylene gas cutting-off apparatus, two or three motor trucks, a 6000-gal. and an 8000-gal. steel storage tank and a second hand generator set of 300 to 400 k.w., 250-volt, direct-current, direct connected to engine. As the floor space for the latter is limited the equipment must be as compact as possible.

The Reading Crane & Hoist Company, Reading, Pa., has booked considerable business recently. Inquiries have, however, been somewhat lighter and scattered over a wide territory. Quite a good volume of business has been under negotiation for export to Mexico and South America, but orders develop rather slowly. A good volume of general orders is on hand and the company's plant is operating close to full capacity. Recent shipments include a double I-beam traveling crane to the Omaha Electric Light & Power Company, Omaha, Neb., a single I-beam traveling bridge for the United States Bureau of Standards, Washington, D. C., and two cranes each to the Brompton Pulp & Paper Company, East Angus, Quebec, and the Piermont Paper Company, Piermont, N. Y.

The Newton Machine Works, Inc., has been securing a fair amount of business in special equipment, purchased largely for replacement or for special requirements. Purchases recently have been largely of a spasmodic nature. The bulk have been principally for cold saw cutting-off machines, rotary planers and milling machines. A recent order was for a slab milling machine to take in work 8 ft. long and to swing cutters 32 in. in diameter. This is believed to be the largest sized slab milling machine ever built.

The Frick Company, Waynesboro, Pa., reports the volume of business transacted so far this year to have exceeded that for the same period last year by 10 per cent. A number of orders have recently been taken and indications point to considerable further business in the near future. Among contracts just closed is one for a 125-ton plate ice plant for the American Ice Company, Baltimore, Md., for which a double acting horizontal refrigerating machine will be furnished, a new type of machine which has been but recently placed on the market. This company is now erecting an addition to its machine shop. The building will be two stories with basement 55 x 75 ft. and of brick and steel. A number of machine tools have already been purchased for the new shop and further purchases of equipment will be made in the near future.

Baltimore

BALTIMORE, MD., September 5, 1911.

Business conditions in the iron, steel and machinery trades has been irregular, characteristic of the midsummer season. In a few instances an improvement over the previous month has been reported, but generally the demand has practically been on about an even basis. In the machine tool and machinery trade the volume of business transacted has been fair. Machinery sales have, for the most part, been small individually, although a few moderate lists, covering such tools as are used by automobile repair shops and small machine plants have been closed. Builders of special machine tools and machinery report August business as having been fair. In the power equipment lines little business of importance is reported. Boiler and tank makers find new work scarce in this immediate vicinity. Several good contracts have been closed by heating and ventilating engineers and negotiations are pending for considerable business, to be completed before cold weather sets in. A good demand continues for contractors' equipment. Municipal work of direct interest to the trade has been quiet, although proposals are being taken for a large amount of sewerage work. Irregular conditions are reported by structural material fabricators. Considerable small work with an occasional large project has developed in the South. Quite a fair amount of structural work for export has been taken by some of the local fabricators. Railroad buying is still on a very conservative basis, although there is a tendency on the part of some of the local roads to broaden out. Most of this, however, is in the way of terminal betterments. The trade generally anticipates more active conditions during the next few months. Several projects in which sellers of machinery and tools are interested are in sight and a better market is anticipated in practically all lines.

The Wilford Mfg. Company, Baltimore, has been incorporated and will engage in the sale of wood and metal working machinery, with headquarters at 202 Marine Bank Building. The incorporators are Albert Wilford, J. Spencer Clark and Frank E. Walsh, Jr.

The Baltimore & Ohio Railroad has awarded contracts for new shop buildings and other improvements at Hardman, W. Va., and Rowlesburg, W. Va., to the Roydhouse, Arey Company, Philadelphia, who will also install the heating systems in the new buildings. The new equipment required will be purchased through E. H. Bankard, purchasing agent, B. & O. Building, this city.

Bartlett, Hayward & Co. deny the report which is again being circulated that they will erect a new machine shop at Scott and McHenry streets. They report business in their general industrial department as being quiet, although the stove and furnace department is very busy preparing for the fall trade.

Wallace Stebbins & Sons report general business in August as having been quite satisfactory, an improvement over that of the previous month being noted. A large share of the orders taken have been for the smaller engines and general power equipment. A fair business is reported in general shop supplies and heating and ventilating specialties.

The Skinner Ship Building & Drydock Company will build a 40 x 45 x 10 ft. pontoon for the Baltimore & Ohio Railroad Company for use at Philadelphia. The pontoon will be equipped with electric pumping machinery, including both pump and motor, to be furnished by the railroad company.

The Atlantic Mill & Lumber Company is building a wood working factory building, storage shed and lumber yard on Dock street, East Baltimore. The main building will be 30 x 57 ft. All the buildings will be fireproof, on concrete foundations and have slag roofs. A moderate quantity of wood working machinery is to be installed, including combination, band and cross cut saws, jointers, moulders, etc., all to be electrically driven.

The Aumen Machinery & Supply Company reports business during August to have been about even with that of the previous month. Inquiries have been comparatively good although confined to small and medium, wood and metal working equipment. The bulk of the sales have been in single tools, although an occasional larger order comes out. The most extensive list closed recently was for a line of tools for a moderate size automobile repair shop. Small tools and supplies were fairly active during August and the outlook for a moderate increase in general business is considered favorable.

The Page Engineering Company, 113-121 East York street, has acquired a tract of land on Claggett street, South Baltimore, 98 x 1385 ft., extending to the water front, on which is being erected a modern machine shop. The plant will include a main building 40 x 100 ft. and a wing 32 x 38 ft. Electric lighting and steam heating will be included. In addition to the buildings, a yacht basin and marine railway will be constructed. Some new machinery will be required for installaton in the new plant, but particulars are not available at this time.

John D. Adt continues to operate all departments of the plant at full capacity. While the demand for elevators and elevating machinery has been rather quiet, that for special equipment has been more active. Several good export orders for tobacco-making machinery, one from Chile, South America, and one from England, have recently been booked and further business of that character is in sight. The demand for machine shop supplies and machine work continues active and the general business situation is quite satisfactory with this concern.

The T. C. Bashor Company has taken a number of good contracts for heating and ventilating work, including one for the heating and ventilating in connection with the high pressure plant, for the new Coco Cola Building. The heating installation in the new chapel building of the Mt. Hope Retreat, Mt. Hope, Md., will also be installed and contracts for a high pressure piping system for the new plant of the Canton Box Company and for special work for the Baltimore & Ohio Railroad at Grafton, W. Va., have also been booked. A number of special stacks, spouts, etc., will be furnished the Republican Finance Company for use

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at the Tidewater Portland Cement Company plant at Union Bridge, Md. The demand for boilers, engines and tank work is reported as being rather light. General inquiry is reported good and a number of bids are out on work of both a general and special nature, which will be closed in the near future.

It is reported that the board of directors of the York Water Company, York, Pa., have awarded a contract for the construction of a 1,000,000,000 gal. basin, along the east branch of Codories Creek, in York and Springfield Townships, to Stamper, Royland & Co., of Richmond, Va. The cost of the work will, it is said, exceed $200,000.

Furst Concrete Scow Construction Company has been incorporated and will engage in the manufacture of plain reinforced concrete construction, also the construction of scows, barges and other vessels of concrete and concrete railroad ties. Telegraph poles and other articles will also be manufactured. The capital stock of the company is $100,000. Frank A. Furst is president; Michael T. Homer, vice-president, Joseph J. Hock, secretary, treasurer and manager.

Bids have recently been received by Swift & Co. for the erection of a three-story warehouse building at Eutaw & Camden streets. Plans, it is understood, call for the demolishing of the present building and for the installation of a moden refrigeration plant. Particulars are not yet available.

The Crown Cork & Seal Company denies the report that it will build a branch plant at Sparrow's Point. It had been currently reported that this company would build and equip a plant at that point to take care of certain branches of its business.

It is stated that Glidden & Fritz, architects, have been commissioned to prepare plans for a larger garage and warehouse to be erected for John W. Browers, on Cathedral street, near Biddle street. The proposed structure is to be three stories in height and it is reported that it is to be occupied by the Brown Taxi Company.

Chicago

CHICAGO, ILL., September 5, 1911.

The Hymen-Michaels Company, Chicago, has been incorporated with a capital stock of $2,500, to engage in manufacturing metal goods and machinery. The organizers are Henry L. Stern, Sol Salins, Jesse H. Williamson.

The Chicago Bearing Metal Company, Chicago, is investigating sites with a view to erecting branch plants at points east of Buffalo and at Kansas City or Denver.

The Illinois Smelting & Refining Company, Chicago, advises that it will add to its line the manufacture of blue vitriol and is having plans prepared for an addition to its works for this purpose.

The Illionis Valley Sand Company, Ottawa, Ill., is contemplating the rearrangement of its works to about double its present capacity.

The Weaver Mfg. Company, Springfield, Ill., manufacturer of the Weaver rolled jaw chuck, has moved into its new plant at Ninth & Cornell avenues. This company is in the market for a tool and cutter grinder, 1¼-in. turret lathe, and an 18-in. engine lathe.

The Double Blast Mfg. Company, North Chicago, Ill., has been incorporated with a capital stock of $6,000 to engage in the manufacture of soldering furnaces. The incorporators are Nathan W. Lundy, Anna C. Lundy and P. C. Regan.

The Barnard & Leas Mfg. Company, Moline, Ill., is considering the building of a new machine shop, foundry and power plant, but as yet has not decided when it will begin work. It is quite likely, however, that the machine shop will be the first new building constructed, and of course its equipment will be modern in every respect. The company manufactures special mill and elevator machinery and wood split pulleys.

The Buchanan-Lawrence Company, Joliet, Ill., has been incorporated with $200,000 capital stock by W. M. Buchanan, Edward R. Daley and Erik Dillberg, and will equip a plant for the manufacture of boots and shoes.

Lawrence Bros., Sterling, Ill., are pushing rapidly the work of erection on their new plant. New equipment for the manufacture of hardware specialties will be installed.

At Kankakee, Ill., an addition is to be built augmenting the electric light and power station. The new building will be 60 x 130 ft., and will provide room for a new capacity.

The Eclipse Gas Stove Company, Rockford, Ill., is preparing plans for a four-story addition, 70 x 80 ft.

The Illinois Welding Company, Springfield, Ill., which has been in operation for two or three months, was recently incorporated with a nominal capital stock of $2,500.

The Alton, Jacksonville & Peoria electric line, with offices at Alton, Ill., is about to erect a new power house in that city.

The Star Bit & Tool Company, Rockford, Ill., will manufacture wood-boring tools. The company will have a capital stock of $30,000 and was incorporated by August Weyburg, Henry Lind and Robt. C. Lind.

The machine shops at the Hawkins Mine of the International Harvester Company, Nashwauk, Minn., were severely damaged by fire last week. The loss is estimated at $50,000.

The Minneapolis Sash & Door Company is to erect a $90,000 six-story factory in Minneapolis, Minn. The company owns property 113 x 363 ft. and the new plant is to be the largest for the manufacture of sash and doors in Minneapolis.

The Oostburg Steel Foundry Company, Oostburg, Wis., recently decided to close down its plant indefinitely. This action has been followed by the filing of a notice of dissolution.

The R. V. Mfg. Company, Milwaukee, Wis., has been incorporated to manufacture hot water and steam radiator valves. The company was organized by George E. Page, C. A. Stone and Geo. Davelaar, with a capital stock of $10,000.

At Boone, Iowa, ground is being broken for a new electric lighting plant, the construction of which is to be completed at the earliest possible time.

The Lytle Construction Company is preparing plans for the construction of a water works system at Pierson, Iowa. This company's office is at Sioux City, Iowa.

The Central Foundry Company, Oklahoma City, Okla., is planning to spend $25,000 in completing larger quarters into which it expects to move shortly. Max K. Weigel is president of the company.

Cincinnati

CINCINNATI, OHIO, September 5, 1911.

September is ushered in with some improvement to be noted in the machine tool trade. While business is yet below normal, indications are that the fall season will not be so disappointing a period as was predicted by numbers of manufacturers some time ago. Just at the moment it appears that Southern business is leading that from other sections of the country. Buying is confined principally to the general trade, with the railroads and automobile manufacturers contributing only a comparatively small number of orders.

Power plant equipment continues on the active list and electrical machinery is also in good demand.

An educational school for printers' apprentices is a new departure for the Cincinnati Continuation School, which will be under the supervision of Dean J. H. Renshaw. It will be conducted along the same lines as the school for machinists' apprentices, the students receiving full pay for the time they are in school.

George E. Whitney, secretary Lima State Hospital, Lima, Ohio, will open bids September 15 for the following power plant equipment: Eight 200-h.p. water tube boilers, six engines ranging from 135 to 265 h.p., six generators ranging from 75 to 150 k.w., and the usual equipment of heaters, pumps and piping. Specifications may be seen at the offices of J. G. Lorimer, superintendent of construction, Lima, Ohio, and of F. L. Packard, the designing engineer, Columbus, Ohio.

The Stacey Mfg. Company, Elmwood place, Cincinnati, has made up plans for an addition to its plant that will be approximately 50 x 250 ft., of regular mill construction. Harry Hake, Cincinnati, is the designing architect. The company makes a specialty of gas tank work.

The Armor Steel Castings Company, Cincinnati, drew off its first heat in its new steel castings plant at Winton place September 1. The company will manufacture steel castings under the Gebhard patents for hardening steel which it controls.

The Kern Machine Tool Company announces that it will move its Cincinnati factory, located at Winton place, to East Hamilton, Ohio, where it has acquired

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the building formerly occupied by the Fireproof Metal Furniture Mfg. Company. It expects to have the plant at the new location in full operation by October 1.

It is reported that the International Chemical Corporation, of New York City, has acquired a controlling interest in the Central Mfg. Company, Cincinnati, and that it will soon commence the construction of a large fertilizer plant at Lockland, a Cincinnati suburb.

On September 12 F. A. Geier, president of the National Society for the Promotion of Education; J. H. Cone, commissioner of that association; J. M. Manley, local secretary of the National Metal Trades Association, and J. H. Renshaw, dean Cincinnati Continuation School, will leave Cincinnati on invitations from Detroit, Kalamazoo and other cities to explain industrial educational ideas as carried out by several Cincinnati schools.

A report just made public by the Triumph Electric Company, Oakley-Cincinnati, shows that August of this year was the best month in the history of the company. Sales for the past six months were 15 per cent. greater than during the corresponding period of 1910. although the year 1910 showed an increase of 33 1-3 per cent. over the annual average for the previous 10 years.

The Piqua Motor Company, Piqua, Ohio, has been incorporated with $50,000 capital stock. L. H. Wessel and Edward K. Keifer are named among the incorporators. It is probable that some small machine tool equipment will be required later.

The McMaul Boiler Mfg. Company, Toledo, Ohio, contemplates erecting a boiler shop in East Toledo.

W. H. Mertens, receiver for the Eureka Foundry Company, Cincinnati, presented a very encouraging report to the creditors of that company at a meeting held September 2. Operations in August showed a good profit and September bids fair to be even better.

The Alvey-Ferguson Company is now installing machinery in its new factory at Oakley, Ohio, and expects to have the plant in operation within 30 days. Most of the equipment was brought from the company's Louisville plant, which will be abandoned.

The Lowe Brothers Company, Dayton, Ohio, manufacturer of paints and varnishes, is building a large addition to its main factory. The building is 46 x 175 ft., five stories and basement, of reinforced concrete and fireproof throughout. It will be equipped with all the latest appliances for the manufacture of paints. Part of the building will be used for testing room and laboratory.

Cleveland

CLEVELAND, OHIO, September 5, 1911.

There has been a little more activity in the local machine tool market during the week due to the placing of some small lot orders. During the previous few weeks business was almost wholly in small tools, but now there is a little more demand for medium sized tools. While dealers look on the buying as a temporary spurt, there is a feeling that with the vacation season now over, September will show some improvement in the volume of sales. Business in August was somewhat better than during July. Some of the dealers report that their sales during the past month increased about 20 per cent. over the previous month. Among the local machine tool builders conditions show little change. Makers of automatic screw machines and turret lathes report some improvement in orders. In general machinery there is a good demand for coal tipples. Some orders for good sized installations are about to be placed. The demand for light traveling cranes is quite active. Some orders are coming out for foundry equipment, the market for which has been very dull for some time. The rubber tire making industry in Akron is reported to be in a very satisfactory condition.

A new plant for the manufacture of cranes, hoists and chain is being built by D. Round & Son, Cleveland. The plant will be located at stop No. 3 on the Northern Ohio Traction line and the Pennsylvania Railroad just out of Cleveland. The building will be 50 x 250 ft., two stories, of brick and steel construction and equipped with Detroit-Fenestra steel window sash. The machinery will be electrically driven, power being furnished from the adjoining plant of the Cleveland Chain & Mfg. Company, of which Mr. Round is president. A new generator of 50 to 100 hp. will be purchased. A little later the concern will be in the market for two 200-lb. power belt hammers. Little if any other machinery equipment will be required, as the machinery in the present plant at 7625 Broadway will be moved to the new site.

The Lake Erie Nail & Supply Company, 412 Frankfort avenue, Cleveland, has taken the agency in this territory for the complete machinery line of the Hamilton Machine Tool Company, Hamilton, Ohio, and for the wood working machinery of the Advance Machine Company, Toledo, Ohio.

The Chubb Cement Mfg. Company, Huron, Ohio, has been organized with a capital stock of $10,000 to manufacture cement building blocks and drain tile. The company has secured the building formerly occupied by the electric light plant. It will purchase a 8-hp. engine, a 15-hp. boiler and cement block and tile making machinery. Benjamin J. Chubb is the manager.

The manufacturing business that has been conducted in Bucyrus, Ohio, by the Crooks-Uhle Machine Company has been incorporated and the name changed to the Crooks-Uhle Mfg. Company. The capital stock is $10,000. Officers have been elected as follows: President, F. A. Wise; vice-president, F. E. Uhle; secretary-treasurer, J. W. Miller; general manager, Earl G. Crooks. The company manufactures light steel novelties and will add additional products along the same line. Some new machinery will be installed.

The Star Drilling Machine Company, Akron, Ohio, is enlarging its plant by the erection of a new blacksmith shop and an addition to its boiler shop. The company expects to buy several steam hammers for its blacksmith shop. The boiler shop will be equipped with a 12-ton crane, which has been arranged for.

The Trumbull Public Service Company will enlarge its steam power plant at Warren, Ohio, by the erection of a boiler room, 40 x 40-ft., in which a 500-hp. boiler will be placed. It is also announced that the company will make another similar addition to its plant next spring.

The Youngstown Sash Weight & Foundry Company, Youngstown, Ohio, has been incorporated with a capital stock of $15,000 by R. A. Potts and others. The company will make sash weights and other products. A site has been secured on which a plant will be erected.

The McNaul Boiler Mfg. Company, Toledo, Ohio, will build a new plant in East Toledo, near the plant of the Republic Iron & Steel Company. The building will be 70 x 240-ft. of brick and steel construction.

It is announced that the Ohio Valley Enamel Company will build a new enameling plant at Shadyside, Ohio, near Bellaire. Business men have raised $10,000 to purchase a site.

The Burt Mfg. Company, Akron, Ohio, makers of ventilators, oil filters, etc., reports that the volume of its business so far this year is up to that for the corresponding period of last year, which was the best year in the company's history.

The Wise Furnace Company, Akron, Ohio, has decided to postpone until next spring the building of a new foundry, for which a site was secured some time ago.

F. L. PRENTISS.

Detroit

DETROIT, MICH., September 5, 1911.

Little that is new has developed in the local machinery market, the dullness noted last week being still in evidence. Dealers report that the volume of business is about 40 per cent. less than normal at the present time and current orders for machine tools of standard lines are small and scattered and are, in the main, for necessary replacements. Some activity is being noted in grinding machinery for mills and grain elevator equipment is also somewhat in demand following the recent organization of quite a number of small elevator companies throughout the State. Business for the automobile trade is scarce and no new developments are looked for in this direction in the immediate future. Building operations are beginning to show a decline, which is natural considering the volume of work which has been completed this summer.

The Motor Foundry Company has been incorporated with a capital stock of $35,000 by John H. James, Joseph A. Geyman and Arthur Webster. The new company is equipping a large building in the east end factory district for the production of iron and steel castings.

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The Vanadium Saw Mfg. Company has been organized by Eugene W. Wilson, John G. Kramer and Thomas S. Sprague with a capital stock of $1,000,000. No manufacturing plans have been announced.

Frank J. Gorman has purchased the buildings formerly occupied by the Ford Motor Company at Brush street and Piquette avenue. It is understood that Mr. Gorman will equip a portion of the plant for the manufacture of motor cycles.

The Pabst Brewing Company, Milwaukee, Wis., is erecting a large brick mill and warehouse at its Detroit branch.

The Phoenix Engineering Company has filed notice of an increase of capital stock from $10,000 to $100,000.

The Columbus Castings Company has filed articles of incorporation giving the capital stock at $30,000. Frank Illensberger, Thomas H. Sedley and Edward L. Nelson are the principal stockholders.

The Machinery Sales Company has been organized by Fred D. Cooley, John A. Skelton and Ray C. Silver with a capital stock of $3,000 and will deal in machinery.

The Manistee Iron Works, Manistee, Mich., has decided to buy the American rights to manufacture a rotary pump recently patented in England. The capital stock of the company will be increased to $800,000 and it is understood that a goodly portion of the increase will be expended in modernizing the company's plant in preparation for the manufacture of the new pumps.

The Kellogg Corn Flakes Company, Battle Creek, Mich., has a new building under way which will double the capacity of the company's plant and will be of fireproof construction 66 x 120 ft. and five stories.

The Reo Motor Truck Company, Lansing, Mich., is making preparations for extensive improvements at its plant. The company will enlarge the present buildings and will install new and improved machinery so that all parts of the cars can be made at the local factory.

Negotiations are under way for the removal of the plant of the Kelley Chair Company, Kent City, Mich., to Hancock, Mich. W. C. Kelley is president of the company.

The large cooperage shop of the Cadillac Mfg. Company, Cadillac, Mich., was destroyed by fire this week, entailing a loss of $6,000. The shop will be rebuilt in the spring.

The city of Coldwater, Mich., has awarded the contract for the new machinery at the municipal power house to the Westinghouse Electric Mfg. Company.

The Grand River Butter Company has been organized at Ionia, Mich., by C. Romander, R. A. Hawley and others with the idea of operating a chain of creameries in that section of the State.

W. K. Kellogg, proprietor of the Corn Flakes Company, of Battle Creek, Mich., has purchased the plant of the defunct Corl Piano Company in that city and will utilize the building for the manufacture of shipping cases.

It is reported that the Manistee River Power Company will soon begin work on a large water power project on the Manistee River. Leon F. Titus and Stephen Lantner, of Traverse City, Mich., are among those interested in the company.

Farmington, Mich., has voted in favor of bonding for a water works system. An electric lighting system is now in process of installation.

The East Shore Woodenware Company, Frankfort, Mich., suffered an almost total loss of its plant by fire August 26 with a resultant damage amount to about $80,000.

The National Auto Truck Company, Bay City, Mich., will soon begin the construction of its new buildings which will include a manufacturing building, carbonizing building and testing house. Considerable equipment will be required.

The Commonwealth Power Company, of Jackson, Mich., is planning the construction of a large power house in Battle Creek, Mich., in connection with the company's Au Sable River power project, recently noted in the *Iron Age*.

The new chemical plant of the Lake Superior Iron & Chemical Company, at Manistique, Mich., is nearing completion. A considerable part of the machinery is being imported from Germany.

The Wolverine Mfg. Company, Zeeland, Mich., will increase its capital stock from $150,000 to $350,000 and greatly increase the capacity of its plant, including the equipment of a new department for the manufacture of phonographs.

It is reported that the Minneapolis, St. Paul & Sault Ste. Marie Railway will locate car shops at Gladstone, Mich.

Baraga, Mich., has bonded for $30,000 for the construction of an electric light and water works plant. Address the village clerk.

C. Y. Bennett, of St. Ignace, Mich., has purchased a large tract of timber near that city and it is understood that he will erect a saw mill in connection therewith.

Indianapolis

INDIANAPOLIS, IND., September 5, 1911.

W. J. Holliday & Co., Indianapolis, manufacturers of shafting and structural shapes, has acquired a tract of seven acres on which it proposes to erect a steel frame building to accommodate its structural steel and plate making department. The building will be equipped with electric cranes, shears, punches, etc.

The New Process Lighting & Heating Company, Laporte, Ind., has been organized with a capital stock of $50,000 and expects to build a new factory at once.

The Kelly Foundry & Machine Company, Goshen, Ind., is about to place a contract for the erection of a one-story building 75 x 155 ft.

The Lebanon Heating Company's plant at Lebanon, Ind., will be sold at receiver's sale at a date to be fixed by the court.

The Socker-Bettner Company has been incorporated at New Castle, Ind., with $10,000 capital stock by Homer H. Socker, C. F. Bettner and C. E. Socker. The company will deal in hardware.

The Granger Electrical & Mfg. Company, Warren, Ind., has been incorporated with $50,000 capital stock to manufacture electrical novelties. The directors are Francis Granger, R. L. Tobin and F. Canady.

The Auto Lighting & Electrical Company, Indianapolis, has been incorporated to manufacture vehicle lights. The directors are G. S. Montfort, C. R. Brown and F. C. Parker.

The J. B. Arpin Coal Co., Brazil, Ind., has been incorporated with $50,000 capital stock. The company has leased several acres of land a few miles west of the city and will proceed to sink a shaft for the first mine. The members of the company are Chicago and Grand Rapids capitalists and are represented by McNutt, Shattuck & Robinson, attorneys, of Brazil.

The South

LOUISVILLE, KY., September 5, 1911.

Business is opening up with the beginning of the first month of fall, and a steady flow of inquiries is reported. Hesitation on the part of buyers in closing for machinery for which they are known to be in the market is a somewhat discouraging feature of the situation, but this merely delays business and does not eliminate it. The improvement noted recently in the demand for machine tools continues to be felt, and a number of comfortable orders in this line have been booked. Louisville has just completed its municipal fiscal year and reports building during the past 12 months amounting to over $5,500,000, the largest recorded. Heavy building operations during the succeeding period are also in prospect and dealers in contractors' outfits are expecting big business from this source.

Van Vredenburgh & Co., 518 West Chestnut street, Louisville, are equipping a general machine shop and will refit pipe tools, make dies and do other machine work. Richard Van Vredenburgh is the proprietor of the shop. The equipment he has bought thus far includes a Universal tool and cutter grinder.

The Louisville Cement Company has purchased for installation at its Speed's, Ind., cement mill a complete Robbins belt conveyor having a capacity of 450 tons per hour. The conveyor will carry cement from the crushers to several large concrete storage bins which have been recently erected.

The United States Cast Iron Pipe & Foundry Company has purchased a six-ton Howe scale of special design for use in weighing pipe at its Louisville plant.

The Hillen Mfg. Company, Louisville, which recently began operations, has purchased three brass turret lathes of Warner & Swasey manufacture from E. D. Morton & Co., Louisville. The Hillen company is operating a brass foundry and manufacturing plumbers' supplies.

E. D. Morton & Co., Louisville, dealers in power

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transmission, machine tools, etc., have taken the local agency for the Otto gas engine.

G. O. Tuck & Co., Louisville, manufacturers of tobacco, will close a deal shortly for the purchase of an automatic machine for drying leaf tobacco.

The Pioneer Coal Company, recently organized by Louisville capitalists, has begun to make purchases of machinery and supplies in connection with its coal mining operations near Barbourville, Ky., in the southeastern part of the State.

The Eagle Casting Company, Winchester, Ky., supplied a large number of ornamental iron standards used in some boulevard lighting which has recently been done in Louisville through the co-operation of merchants, lighting companies and advertising concerns.

Neville Kellner & Co., Louisville, will be awarded the contract for installing a heating plant in the addition to the Parkland school in Louisville by the Board of Education. A Hart & Krauss boiler will be used.

The city of Owensboro, Ky., has closed a contract with the Westinghouse Electric & Mfg. Company, Pittsburgh, for the installation of a steam turbine and generator in the municipal lighting plant. The cost of the equipment will be $14,500. The George F. Stocker Company, St. Louis, secured the contract for the installation of a switchboard and cooling tower.

A co-operative company is being organized at Franklin, Ky., by the farmers of Simpson county for the erection of a $40,000 elevator and flour milling plant.

The Nicholasville Water Company, Nicholasville, Ky., has filed amended articles of incorporation increasing its capital stock from $8,000 to $20,000. It is understood that considerable improvements are to be made.

The Hazard Light & Water Company, Hazard, Ky., has filed articles of incorporation, its capital stock being $25,000. The incorporators include Jesse Morgan, J. B. Hoge and T. S. Ward.

The Harris Coal Company has been incorporated at Providence, Ky., for the purpose of operating a coal mine. F. B. Harris, B. C. Harris and Thomas E. Finley are stockholders.

The Consumers' Lumber & Coal Company, Lawrenceburg, Ky., has been organized for the purpose of operating a planing mill. The mill is now being equipped.

The Paducah Water Company, Paducah, Ky., is erecting a boiler house adjoining its pumping station. Water tube boilers will be installed and a coal elevating and conveying outfit will also be required. A steel smoke stack will be erected.

Dayton, Tenn., has voted in favor of issuing $225,000 of bonds for the purpose of installing a system of water works. Euclid Waterhouse, John A. Denton and W. A. Ault are commissioners in charge of the issue.

The Great Falls Power Company is planning a hydroelectric plant on the Caney Fork River near McMinnville, Tenn. It is expected that the plant will develop 55,000 hp. The work of constructing a dam will be begun shortly, the company having completed the purchase of the necessary riparian rights.

Prices on an engine are being asked by the Riceville Gin & Warehouse Company, Riceville, Tenn.

A larger site for the water works pumping station of Clarksville, Tenn., has been purchased by the municipality and the station will be moved. It is expected that some changes in the equipment will be made in making the removal.

Ransom & Frierson, Shelbyville, Tenn., are planning the erection of a cotton gin. A power press will be among the items of equipment purchased.

It is reported by a Nashville, Tenn., industrial bureau that the Cherokee Globe Company, Gainesville, Tex., will remove its plant to Nashville and that it will be considerably enlarged.

Maryville, Tenn., will vote on a $75,000 bond issue for water works purposes on Wednesday, September 20. The issue was authorized at the last session of the State Legislature.

The Jackson Ornamental Iron & Bronze Works has been incorporated at Jackson, Tenn., for the purpose of erecting a plant costing $25,000. Steel, bronze and brass grill work for use in bank and office fixtures will be the chief output of the plant. J. C. Felsenthal has been chosen president; W. R. Sparkman, vice-president; J. J. Losier, secretary and general manager; L. J. Weis, treasurer, and W. M. Burns, superintendent. Equipment for the plant is now being purchased.

The South Pittsburg Light Company has been incorporated at South Pittsburg, Tenn., with $10,000 capital stock by W. C. Houston, A. L. Kelly and Charles Houston.

The Florence Wagon Company, Florence, Ala., has under consideration plans for removing its plant to Chattanooga, Tenn. It has a capital stock of $250,000.

The Alabama-Georgia Syrup Company, Montgomery, Ala., has decided upon the erection of a refrigerating plant for use in storing syrup. This apparently offers a new field for refrigerating machinery, as cold storage has not heretofore been regarded as essential to the handling of syrup. The company intends to expend about $25,000.

Tracy W. Pratt, Huntsville, Ala., who is endeavoring to organize a company for the establishment of a paper mill, states that the concern will build a plant costing $400,000. In view of the large amount of low-grade lumber in the form of waste from sawmills which would be available it is believed that the plant could produce paper very cheaply.

R. A. White, R. T. Dallas, A. W. Bingham and others, of Ardmore, Okla., are organizing a company with $10,000 capital stock for the manufacture of a galvanized iron egg crate.

W8. L. Bassalo, Ensley, Ala., plans the erection of a plant for the manufacture of a patented wrench.

The Piedmont Foundry & Machine Company, Hickory, N. C., is in the market for a belt-driven stake riveter. The company specifies that it have 72-in. throat capacity for ⅝-in. hot rivets.

Ira Mowery is contemplating the erection of a plant for the manufacture of acetylene generators at Paragould, Ark. The Paragould Commercial Club has the matter in hand.

The American Net & Twine Company, Anniston, Ala., has decided upon the enlargement of its plant. The concern plans the expenditure of $150,000 in the improvements. A contract for the new building has already been let.

A peanut hulling plant will be erected at Jonesboro, Ark., by the Arkansas Peanut Growers' Association. J. M. Jones is president and R. H. Hancock secretary and treasurer of the subsidiary organization formed for the purpose of erecting the plant.

St. Louis

ST. LOUIS, MO., September 2, 1911.

Business in the machine tool line has been rather quiet with respect to actual orders placed, but the dealers report considerable in sight. In consequence they look for September to show up fairly well in comparison with the months that have preceded it. The transactions of the week have been for the most part in individual machines.

The announcement is made that the capacity of the Standard Oil Company's large refineries at Wood River, Ill., about 15 miles from St. Louis, will be practically doubled.

The Fulton Iron Works, which is building a new plant on the western edge of the city to which it will remove as soon as completed, has placed its order for the crane equipment. This will include nearly a dozen electric cranes, several of which will be of 30 tons capacity.

The new Municipal Courts building of St. Louis, which is practically completed, awaits the order of the Board of Public Improvements for the boilers and heating and lighting equipment. It is expected to be of sufficient capacity to heat, light and provide power for the building itself, the City Hall adjoining and the police headquarters and courts buildings across the street.

The St. Louis Board of Public Improvements has decided to install in the municipal testing plant a new machine capable of crushing the hardest of rock and brick for use in testing street materials.

The Huttig Sash & Door Company, which was recently burned out, has commenced the construction of a new unit plant, the first unit to cost $200,000, aside from the mechanical equipment.

The Ralston Purina Company has begun the construction of a $40,000 addition to its factory and will equip it with machinery for the increase of its product.

The Mississippi Valley Glass Company has begun the construction of a $35,000 addition to its glass manufacturing plant, and will increase its equipment.

The Byrnes Belting Company has begun the erection of its new $40,000 building to increase its production capacity.

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G. L. Fraser, general manager of the Coalamont mine of the Columbia Coal & Coke Co., Winnipeg, Man., with mining properties in British Columbia, has been in the southern Illinois mining district inspecting the mines there previous to equipping the Coalamont plant with about $500,000 worth of machinery.

The Central Electric Light, Heat & Power Company, Gibson, Ill., has been incorporated with $100,000 capital stock by Archibald Hood, James Hood and H. L. Clarke.

The Quincy & Western Railway Company has been incorporated to build a railroad from Niota to Quincy, Ill. The incorporators are W. T. Duke, H. F. Dayton, J. P. W. Wall, W. H. Govert and S. B. Montgomery. The line will be electric.

The E. W. Ray & Son Lumber Company, St. Joseph, Mo., with a capital stock of $50,000, to manufacture lumber, has been incorporated by E. W. Ray, E. W. Ray, Jr., and Louis F. Schilling.

The Carthage Electric Company, Carthage, Ill., has been incorporated by William Matthiesen, Victor W. Olff and H. C. Hall and will equip a plant for the manufacture of electrical apparatus.

The Dorris Motor Car Company, St. Louis, has completed plans for the erection of a new plant for the manufacture of automobiles. It will be 187 x 300 ft., three stories, and will immediately adjoin the present large plant. The capacity of the company will be trebled by the addition.

Through the offices of the Business Men's League of St. Louis a plant for the finishing of cotton goods will be established here immediately, large enough to employ a force of 300 hands. A building of 45,000 sq. ft. floor area has been leased and $100,000 will be spent in equipping it. The new plant will do bleaching, dyeing, printing and finishing of all kinds of cotton goods.

The Goodenough Mining Company, with $50,000 capital stock, has been incorporated at Joplin, Mo., by C. B. Rhodes, Frank E. Weeks and Frank Nicholson. It will equip its mining property with machinery at once.

The architects are announced to be at work on the plans for the large buildings to be erected on two blocks of ground bought here for the Western branch of the Lowell Bleacheries, Lowell, Mass. The plant is expected to approximate the capacity of the home plant and will handle all the trade which can be reached economically from St. Louis.

The Automatic Register Company, East St. Louis, Ill., has had its machine tested on the Illinois Traction System. The device not only records the number of passengers who enter the car or train but the mileage traveled by each. It is stated that no attention from the passenger or conductor is required in working the device. The company has an authorized capital stock of $1,000,000. A. D. Branhan, the inventor, is president of the company; Judge William P. Launtz, first vice president and general counsel; Adolph R. Korreck, second vice president; Paul W. Abt, secretary and treasurer; Ernest Lane, general manager; Gebhard A. Buettner, superintendent.

The Western Wheel Barrow & Mfg. Company, Kansas City, Mo., will erect a new factory at Portsmith, Ark., at a cost of $25,000. Plant will be used for the manufacture of wheelbarrows and swings and for foundry purposes. New machinery will be required. J. P. Ellison is secretary and treasurer of the company.

Texas

AUSTIN, TEX., September 2, 1911.

If present plans are carried out several hundred thousand acres of raw land in the Gulf coast region of Texas will be reclaimed by means of irrigation within the next year or two. Some of these irrigation projects involve the construction of large canal systems and the installation of pumping plants which will give an enormous flow of water. The new law authorizing the creation of irrigation districts and the issuing of bonds upon the land involved is stimulating the inauguration of several projects of this character. In the lower Rio Grande valley alone one district to embrace 125,000 acres of land upon which bonds to the amount of $3,000,000 are to be issued is now proposed. The commissioners court of Chambers county sitting at Anahuac has been petitioned to order an election to vote on the proposition of creating an irrigation district to embrace about 75,000 acres of land bordering the Trinity River. The proposition is said to be generally favored by the tax payers of the proposed district.

The Southwestern Portland Cement Company will make improvements to its plant at El Paso at a cost of $12,000 in addition to the large water purification plant that it is installing.

The Chanute Window Glass Company is reported to have completed arrangements for the erection of a large glass factory at Wichita Falls.

The Rio Hondo Gin Company has been formed for the purpose of installing a cotton gin at Rio Hondo. Its capital stock is $6,000. The incorporators are F. M. Paul, Ed. H. Smith and Alba Heywood, all of San Antonio.

J. G. Warfield has promoted the organization of a company which will erect a factory at Waco for the manufacture of a stalk-cutting machine. About $100,000 will be invested in the enterprise, it is stated.

The Brice Gin Company has been formed at Clarendon, with a capital stock of $6,000. The incorporators are R. S. Kimberlain, John Grady and C. L. Benson.

The Lutcher & Moore Lumber Company will install a new 200-hp. engine and new matching machine in its planing mill at Orange. New filing and engine rooms will also be erected.

The City Council has under consideration the construction of a complete sewer system for Bay City.

The lumber mill of the Aldridge Lumber Company at Aldridge, which was recently destroyed by fire, entailing a loss of about $60,000 will be immediately rebuilt. The new mill will have a much larger capacity than the one destroyed.

The city of Terrell is erecting a new concrete power house for its water works plant.

Collier & Love are installing two large irrigation pumping plants near Hoban. They are also putting in a large plant near Barstow.

Stump Robbins, Saragosa, will install a water works plant and distributing system for that town.

The Troup Gin, Mill & Light Company has taken over the electric light plant at Troupe, and has just finished the installation of a cotton gin here. It is also operating a sawmill, box factory and novelty woodworking plant.

The window glass factory of the Texas Glass Company at Texarkana is to be nearly doubled in capacity. When the proposed enlargement is finished it will be one of the largest window glass factories in the United States, it is stated. R. M. Patterson is manager.

The Brownwood Ice & Fuel Company is rebuilding its ice plant at Brownwood, which was destroyed by fire a few weeks ago. The new plant will have a daily capacity of 70 tons.

The Business Men's Club of Waco is promoting the establishment of a large factory for the manufacture of overalls and working clothes. The factory will start with 100 machines.

H. E. Luck and associates are making good progress with their plans for the establishment of an automobile factory at Cleburne.

J. A. Huston is installing new machinery and making other improvements to his cotton gin at Malaga, N. M.

The Meerschaum Company of America contemplates establishing a factory at Deming, N. M., for the manufacture of pipes and other articles out of meerschaum. It owns a large deposit of meerschaum, situated 28 miles from Silver City, N. M. Theodore W. Osterheld is chief engineer of the company.

The copper smelter addition to the plant of the American Smelting & Refining Company at El Paso will be finished about October 1. It will cost about $400,000.

At the election held in Austin August 30 for the purpose of ratifying the contract that was entered into recently by the City Commission and William B. Johnson, of Hartford, Conn., representing the Hydraulic Properties Company, of New York, for the reconstruction of the dam across the Colorado River at this place and the installation of a hydroelectric plant comparatively few votes were cast against the proposition. The cost of the proposed works is $1,720,000. The hydroelectric plant will develop a minimum power of 7500-hp. The dam will be of reinforced concrete construction.

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The Wilkins Trunk Mfg. Company, Dallas, is about to erect a new factory of reinforced concrete construction three stories 50 x 150 ft. The new plant will cost approximately $40,000. John F. Wilkins is vice-president.

The Texas Rolling Mill Company, Fort Worth, is about to add to its plant a fabricating department in which a car repairing equipment will be installed. To provide for these additions the capital stock of the company has been increased from $175,000 to $300,000.

The Pacific Coast

PORTLAND, ORE., August 29, 1911.

The machine tool business is rather quiet. The only transactions in the heavier class of tools consist of a few orders for single tools from widely separated points, and aside from prospects of the establishment of a few new shops there is little encouragement in the outlook. The demand for small shop equipment is keeping about on a level with the record of the last month or two, but is hardly sufficient to offset the dullness in heavier equipment.

The general market, aside from metal working tools, is in very satisfactory shape, with a fair number of large orders and a heavy volume of small business in all departments. Conditions in the interior are favorable, as the grain crop is above expectations and is expected to move rather early at fair prices. More attention is being turned to the fruit industry and the demand for pumps and irrigating machinery is steadily increasing. Wood working and logging equipment, however, continues to occupy a leading position in this market as a whole. The demand for marine gas engines, which has for years been a feature of the Columbia River and Puget Sound districts, is especially strong this summer.

A lot of new equipment, including a No. 3 and a No. 6 Austin crusher, will shortly be installed in the Moskill rock quarry near Chehalis, Wash.

The Moran Company, Seattle, Wash., has taken a contract amounting to about $50,000 for alterations to the steamer Hyades.

It is announced that the Wendling-Johnson Lumber Company, which recently acquired a mill at Acme, Ore., will rebuild the plant on a large scale.

The Security Vault & Metal Company has purchased a site in this city on which it expects to erect a factory shortly.

The Pacific Coast Dry Milk Machinery Company has been incorporated in this city with the object of manufacturing milk condensing and dairy machinery.

J. G. Lidgerwood, of the Lidgerwood Mfg. Company, New York, has been making a tour of the coast. M. H. Dickinson, coast manager, has been supervising the establishment of a branch office in San Francisco.

The Bellingham Brass Mfg. Company has been incorporated at Bellingham, Wash., with a capital stock of $50,000 by C. J. Christopher, F. B. Carrion and E. M. Wilson.

The Seattle, Wash., branch of the S. A. Woods Machine Company has moved from the White Building to 576 First avenue South, where a large store has been occupied.

The Woodcock Mfg. Company has been incorporated at Spokane, Wash., with a capital stock of $40,000 by L. H. Woodcock, Charles Borne and S. Mann for the purpose of starting a saw works.

The Alaska Marble Company is opening a quarry on Chickamin Creek, near Leavenworth, Wash., and plans to install a gang of saws in addition to the quarry outfit.

The hoisting outfit being built by the Willamette Iron & Steel Works, this city, for the Yosemite Lumber Company's plant near Merced Falls, Cal., is said to be the largest of the kind ever used in logging on the coast. It is designed to lower logging cars down a 7600-ft. incline with a maximum grade of 70 per cent.

The Loggers' & Contractors' Machinery Company, this city, has established a branch at Seattle, Wash., under the management of G. L. Davis.

The Multnomah Iron Works, this city, has issued a new catalogue of logging machinery.

The Index-Galena Lumber Company, Index, Wash., has added several Berlin machines to its plant, including an 8-in. band resaw.

The Niagara Falls Ladder Company is installing a plant for the manufacture of ladders at Hoquiam, Wash.

H. N. Woods, of Napa, Cal., is preparing to start a tub and pail factory at Klamath Falls, Ore.

Eastern Canada

TORONTO, ONT., September 2, 1911.

A comment heard on all hands is that both industrial and commercial activity are surprisingly well maintained in a time of considerable political excitement. In many quarters it is believed that if the government is sustained the present reciprocity agreement with the United States will be followed by one including manufactured articles. Canadian manufacturers are not taking any open part in the campaign, but there is no doubt that their good wishes are with the opponents of reciprocity. So far business is as good as it probably ever was at this season in Canada. It is perhaps safe to say that never before was it so good at this time of year. Yet farmers are not selling very freely of their new crop. A reason given is that some of them are looking for higher prices in the event of reciprocity being established. When the farmers do become free sellers trade will increase in volume, and unless more skilled labor comes in among the shiploads of immigrants arriving the problem of getting hands enough to man the factories and workshops will be a serious one.

Oscar Hilip and Adolph Mueller, of the H. Mueller Mfg. Company, Decatur, Ill., have been looking into the advantages of several Canadian cities and towns with the purpose of establishing branch works in this country.

Orders have been placed with the Allis-Chalmers-Bullock Company, Montreal, for six 4000-hp. steam turbines, governors and accessories for the new pulp and paper plant which the Price Bros. Company is building at Jouncaire, Que.

The Price Brothers Company, Quebec, Que., has ordered a steel penstock 29,000 ft. long and weighing more than 2000 tons from the Petroleum Iron Works Company, Sharon, Pa. All the electrical apparatus for the Price Brothers Company new pulp and paper plant at Jouncaire, Que., including two 3000-hp. generators, raising and lowering transformers, two large switchboards and accessories, will be installed by the Canadian Westinghouse Company, Hamilton.

A briquetting plant is being installed at the Mackay mine, Cape Breton, N. S.

The Electric Power Company, whose system ramifies over a large extent of eastern Ontario thickly dotted with towns, has completed important improvements at Brighton, Colborne, Cobourg, Port Hope, Oshawa, Deseronto, Bowanville, Sidney, Napanee, and is proceeding with further improvements in some of the towns mentioned and at Healy Falls, Campbellford, Peterboro and elsewhere.

The Flexible Conduit Company, Guelph, Ont., has been incorporated with a capital stock of $50,000.

An appropriation of $20,000 has been voted by the ratepayers of Middleton, N. S., for the equipment of the town's electric lighting system.

The Hahn Brass Company, New Hambourg, Ont., has installed a 50-hp. motor in its works and will hereafter run these by power from the Hydro-Electric Commission's system.

The town of Orillia, Ont., has awarded contracts for electrical equipment to the Canadian Westinghouse Company, Hamilton, Ont., the cost to be $12,250.

A by-law will be submitted to the ratepayers of Ottawa this month to authorize the purchase of electric pumping equipment.

The Sherbrooke Railway & Power Company, Sherbrooke, Que., has authorized the issue of $300,000 additional bonds in connection with the recent purchase of the Eastern Townships Electric Company, the Lennoxville Light & Power Company and the Stanstead Electric Company. It is proposed to extend the distributing systems of those concerns.

An order has been placed by the Canadian Pacific Railway Company with the Fairfield Shipbuilding Company, of Glasgow, for two steamships 570 ft. long and 68 ft. beam, 18 knots per hour, to supplement the fleet now engaged in the Pacific trade between Vancouver, Yokohama and Hong Kong. They are to be delivered early in 1913.

The Preston Car & Coach Company, Preston, Ont., has under construction a new erecting shop which is 60 x 200 ft.

The Robb Engineering Company, Amherst, N. S., and South Framingham, Mass., has received an order from the Sturgeon Lake Development Company, Toronto, for two Robb-Mumford boilers, 54 in. by 18 ft.

THE MACHINERY MARKETS

and one stack 48 in. in diameter and 80 ft. high, with smoke connection.

The Nova Scotia Car Company, Halifax, N. S., has completed the improvement of its forge department. It has 17 oil furnaces now in operation, having found crude oil to be a more economical fuel than coal. Its gray iron foundry is also in operation. Machinery for the new steel car plant has arrived and is being installed. In October the building of steel cars will be begun at the plant.

The Goodyear Tire & Rubber Company of Canada, Toronto, has received an order for 12,000 ft. of elevator belting for the equipment of 27 elevators in Saskatchewan.

The Dominion Bridge Company, Walkerville, Ont., has obtained the contract to construct a steel bridge for the Canadian Pacific Railway across the Thames at London, Ont.

The Canadian Pacific Railway Company is about to erect at Montreal a 24-stall engine house, a machine shop and a mechanical coaling plant.

The Norton Company, Chippewa, Ont., has given a contract for the extending of its factory, in which is to be installed a considerable amount of new machinery.

The Hamilton Bridge Works Company, Hamilton, Ont., is preparing plans for large new buildings to cost between $150,000 and $200,000.

W. V. Dawson & Co., Montreal, are putting up a large new factory.

Commercial Cars Ltd., Luton, Bedfordshire, England, manufacturer of auto trucks, etc., is arranging for a site in Montreal upon which to establish a large branch plant.

The MacDonald Thresher Company, Stratford, Ont., is about to enlarge its factory.

The Truro Foundry Company, Truro, N. S., is planning to build a new machine shop.

The Campbell Lumber Company, Weymouth, N. S., is arranging to build a large sawmill this autumn or next spring.

The Hamilton Bridge Company, Hamilton, Ont., has obtained the contract for constructing the new power house on the Canadian Niagara Power Company at Niagara Falls, Ont. The cost of the new building and equipment is estimated at $125,000.

The Bishop Construction Company, Toronto, has received the contract for building the plant of the Swift Canadian Company, Toronto, and also for building the Union Stock Yards Company's new structures there.

The Canadian Sunbeam Company, Toronto, has been incorporated with a capital of $200,000 to manufacture electrical machinery, generators, motors, etc.

The International Harvester Company will add to its Hamilton plant a building 100 x 400 ft., of reinforced concrete, to cost about $250,000. David Dick & Sons, Welland, Ont., have the contract for its erection.

Western Canada

WINNIPEG, MAN., September 2, 1911.

The Canadian west will be a very large absorber of equipment and machinery during the next twelvemonth. The good crop has given to many business concerns and the promoters of many undertakings warrant for proceeding with their plans. It will make the obtaining of capital much easier for these projects. In some cases the supplying of funds was made conditional upon the West having a large crop this year. A fact of which mention is called for, because it is generally too little appreciated, is the growing importance of the manufacturing industries of this section. The number of new works employing skilled labor has been very greatly increased in the part of Canada west of the Lakes in the last five years. All the principal cities in the prairie country, as well as the two at the head of the Lakes, have industrial commissioners whose chief duty it is to secure manufacturing enterprises for their cities. These are all having considerable success. Manufacturers are fully occupied at the present time.

The Vancouver Island Power Company, which is a subsidiary company of the B. C. Electric Railway Company, Vancouver, B. C., has ordered from the John McDongall Caledonian Iron Works Company, Montreal, a 6000-hp. Doble Impulse wheel and a 4000-kw. Allis-Chalmers Bullock generator. The power company is thus doubling its capacity, having put in an equipment of the same description about six months ago.

The Edmonton Portland Cement Company, Edmonton, Alberta, has awarded the contract for a 1250-kw., 3-phase, 60-cycle turbo generator set to the Allis-Chalmers-Bullock Company, Montreal; the Goldy & McCullough Company, Galt, Ont., will supply the boilers.

Frank P. Jones, manager of the Canada Cement Merger, Montreal, has been in Winnipeg in connection with the proposed construction of a $500,000 plant here. It is understood that the site has already been purchased. Quotations on from 8000 to 15,000 hp. of electrical energy have been sought from the city.

The Dominion Government has consented to assist the city of Prince Albert, Sask., in the construction of the power plant at McCaul Falls.

The Canada Foundry Company, Toronto, expects to begin on the construction of the railway bridge across the Saskatchewan River at the Pas very shortly. This bridge is for the Hudson Bay Railway the Dominion Government is building. The supply of water mains and the laying of them, to cost altogether $515,000, are undertaken by the Municipal Construction Company, Vancouver, B. C., for that city.

The Independent Harvester Company, Plano, Ill., is about to open up a factory in Brandon, Man., for the manufacture of its machines.

George White & Sons, London, Ont., are building a large warehouse at Brandon, Man., which it has fixed upon as its distribution point for the west.

The Canadian Sumner Iron Works, Vancouver, B. C., will erect a small foundry and iron plant at Burnaby, B. C.

The Prince Rupert Hydro Electric Company, Prince Rupert, B. C., has been incorporated with a capital stock of $5,000,000.

The Northoll Engineering & Construction Company, Vancouver, B. C., has been incorporated with a capital stock of $100,000.

The National Timber Company, Vancouver, B. C., has been incorporated with a capital stock of $250,000.

The Macleod Iron Works, Macleod, Alberta, have dissolved partnership, George E. Guerin withdrawing, and Floyd T. Richfield continuing the business.

A report from Fort Frances, in the Rainy River district, says that the Seine River Lumber Company, is contemplating the building of a large lumber mill near there.

The Edmonton Iron Works Company, Edmonton, Alberta, will enlarge its plant and go into the manufacture of breaking plows.

The Tacoma Match Company, Tacoma, Wash., is negotiating to erect a factory at New Westminster, British Columbia.

The Grand Trunk Pacific Railway is preparing plans for the erection of machine shops at Edson, Alberta, the first divisional point west of Edmonton.

The Alberta Pacific Elevator Company will erect a large grain elevator at Brooks, Alberta.

The rate payers of Edmonton, Alberta, have disapproved the arrangement for the granting of a municipal franchise to the International Heating & Lighting Company.

The Canadian Puget Sound Lumber Company, Victoria, B. C., will shortly start to institute several improvements which will make the plant one of the most modern on the coast. Since the recent amalgamation of the Michigan Puget Sound Lumber Company and the Michigan Pacific Lumber Company into the Canadian Puget Sound Lumber Company, with a capital stock of $5,000,000, many important improvements have been decided upon and will be carried out as the need for them arises. It was recently announced that the new company would erect a large saw mill, either at Victoria or on the mainland, but so far plans to that end have not been completed.

On September 5 the rate-payers of High River, Alberta, will vote on a by-law to raise $125,000, for the purpose of installing water works and a sewerage system.

The Savona Townsite Company, Savona, B. C., intend to immediately install a water system in the town with a daily capacity of 400,000 gal., which will provide for fire protection as well as domestic service.

Construction work has started on the new packing plant which is being erected at Moose Jaw by Gordon, Ironsides & Fares, Winnipeg. The plans call for practically eight large buildings which will cost approximately $2,000,000.

A structural iron works has been established at Barnet, B. C. The promoters are MacDonald & Godson, the latter of the firm of Robertson & Godson, Vancouver.

Current Metal Prices.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report

IRON AND STEEL—

Bar Iron from Store—

Refined iron:	
1 to 1⅞ in. round and square; 1⅛ to 4 in. x ⅜ to 1 in.	₱ lb 1.70¢
1⅛ to 4 in. x ¼ to 5-1	₱ lb 1.80¢
Rods—⅝ and 11-16 round and square	₱ lb 1.80¢
Angles:	Cts. ₱ lb.
3 in. x ¼ in. and larger	1.90¢
3 in. x 3-16 in. and ⅛ in.	2.30¢
1½ to 2½ in. x ⅛ in.	2.05¢
1½ to 2½ in. x 5-16 in. and thicker	1.95¢
1 to 1¼ in. x 5-16 in.	2.05¢
1 to 1¼ x ⅛ in.	2.10¢
⅞ x ⅛ in.	2.20¢
⅝ x ⅛ in.	2.25¢
⅝ in. x ⅛ in.	3.45¢
½ x 3-32 in.	3.90¢
Tees:	
1 in.	2.35¢
1¼ in.	2.20¢
1½ to 2½ x ¼ in.	2.00¢
1½ to 2½ x 3-16 in.	2.10¢
3 in. and larger	2.95¢
Beams	1.90¢
Channels, 3 in. and larger	1.90¢
Bands—1¼ to 6 x 6-16 to No. 8	2.10¢
Burden's "H. B. & S." iron, base price	2.95¢
"Burden's Best" iron, base price	3.15¢
Norway bars	3.60¢

Merchant Steel from Store—

	per lb
Bessemer machinery	1.90¢
Toe calk, tire and sleigh shoe	2.50@3.00¢
Best cast steel, base price in small lots	7¢

Sheets from Store—

Black

	One pass, C.R. soft steel.	R. G. cleaned.
No. 16	₱ lb 2.45¢	2.75¢
Nos. 18 to 20	₱ lb 2.50¢	2.85¢
Nos. 22 and 24	₱ lb 2.55¢	2.95¢
No. 26	₱ lb 2.60¢	3.05¢
No. 28	₱ lb 2.95¢	3.30¢

Russia, Planished &c.

Genuine Russia, according to assortment	₱ lb 12 @14¼
Patent planished, W. Dewees Wood	₱ lb A. 10¢; B. 9¢ net

Galvanized

Nos. 12 and 14	₱ lb 2.75¢
No. 24	₱ lb 3.10¢
No. 26	₱ lb 3.30¢
No. 28	₱ lb 3.60¢

No 20 and lighter 36 inches wide, 25¢ higher.

Genuine Iron Sheets—

Galvanized

Nos. 22 and 24	₱ lb 5.50¢
No. 26	₱ lb 6.00¢
No. 28	₱ lb 7.00¢

Corrugated Roofing—

2½ in. corrugated.	Painted.	Galvd.
No. 24	₱ 100 sq. ft... $3.75	$4.70
No. 26	₱ 100 sq. ft... 2.85	3.90
No. 28	₱ 100 sq. ft... 2.50	3.65

Tin Plates—

American Charcoal Plates (per box)

"A.A.A." charcoal:	
IC, 14 x 20	$6.65
IX, 14 x 20	7.90
A. charcoal:	
IC, 14 x 20	$5.60
IX, 14 x 20	5.70

American Coke Plates—Bessemer—

IC, 14 x 20	107 lb	$4.50
IX, 14 x 20		5.50

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating	$8.70
IX, 20 x 28 with an 8 lb. coating	10.70

Seamless Brass Tubes—

List November 13, 1908. Base price, 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price, 18¢

Copper Tubes—

List November 13, 1908. Base price, 21¢

Brazed Brass Tubes—

List February 1, 1911. 19½¢ ₱ lb

High Brass Rods—

List February 1, 1911. 14⅝¢ ₱ lb

Roll and Sheet Brass—

List February 1, 1911. 14⅝¢ ₱ lb

Brass Wire—

List February 1, 1911. 14⅝¢ ₱ lb

Copper Wire—

Base price, Carload lots mill 13¾¢

Copper Sheets—

Sheet copper hot rolled, 16 oz. (quantity lots) ₱ lb 17¢

Sheet copper cold rolled, 1¢ ₱ lb advance over hot rolled.

Sheet copper polished 20 in. wide and under, 1¢ ₱ square foot.

Sheet copper polished over 20 in. wide, 2¢ ₱ square foot.

Planished copper, 1¢ ₱ square foot more than polished.

METALS—

Tin—

Straits pig	₱ lb 50 @51 ¢

Copper—

Lake ingot	₱ lb 14 @14⅛¢
Electrolytic	₱ lb 13⅞@14 ¢
Casting	₱ lb 13¾@14 ¢

Spelter—

Western	₱ lb 6⅞@ 7⅛¢

Zinc—

No. 9, base, casks	₱ lb 8½¢ Open ₱ lb 9¢

Lead—

American pig	₱ lb 5¼@5⅜¢
Bar	₱ lb 6⅝@6¾¢

Solder—

½ & ½, guaranteed	₱ lb 28¼@28⅜¢
No. 1	₱ lb 26¼@26⅜¢
Refined	₱ lb 24⅜@25⅛¢

Prices of solder indicated by private brand vary according to composition.

Antimony—

Cookson	₱ lb..@10¾¢
Hallets	@10 ¢
Other brands	9@ 9½¢

Bismuth—

Per lb	$2.00@$2.25

Aluminum—

No. 1 aluminum (guaranteed over 99% pure), in ingots for remelting	21¢ and 22¢
Rods and Wire	Base price 31¢
Sheets	Base price 22¢

Old Metals—

Dealers' Purchasing Prices Paid in New York.

	Cents.
Copper, heavy and crucible	10.75 to 11.00
Copper, heavy and wire	10.50 to 10.75
Copper, light and bottoms	9.50 to 9.75
Brass, heavy	7.25 to 7.50
Brass, light	5.75 to 6.00
Heavy machine composition	9.25 to 9.50
Clean brass turnings	7.00 to 7.25
Composition turnings	8.00 to 8.25
Lead, heavy	3.75
Lead, tea	3.50
Zinc, scrap	4.00